SPECIAL STUDY No. 15

Search Behaviour in Canadian Job Markets

by

Dennis R. Maki

prepared for the
Economic Council of Canada

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FOREWORD

In its *Eighth Annual Review*, the Economic Council of Canada focused on the process of government decision-making. In order to illustrate the conceptual discussion of a decision-making framework, several policy areas were selected for more intensive scrutiny. One of these was federal manpower policy.

An important element in manpower policy is the production and dissemination of labour market information. Unfortunately, little is known about the search behaviour of workers or employers in the labour market, yet such knowledge is fundamental to any effort to improve the effectiveness of government programs in the sphere of labour market information. This study, by Professor Dennis Maki of Simon Fraser, analyses new and unique data on how workers search for jobs and employers search for workers in Canada. It represents a pioneering effort in both substantive and methodological terms.

As is the usual practice with a study commissioned by the Council, the contents are the responsibility of the author. Publication under our auspices means that the Council considers the present study a worthwhile contribution to public knowledge and the understanding of economic issues.

Sylvia Ostry, Director,
Economic Council of Canada

PREFACE

This Study presents information on how workers look for jobs and how employers try to fill job vacancies, based upon two sets of heretofore unpublished data. The first of these, dealing with worker search behaviour, is based upon a supplementary questionnaire appended to the January 1969 Labour Force Survey Schedule. The second utilizes information from the Canadian Job Vacancy Survey. This information is certainly unique for Canada, and results of similar surveys on a national scale have never been published for any other country.

Because this is, in a sense, a "pioneering" effort, this Study should not be regarded as a comprehensive examination of search behaviour in Canada. It presents some interesting preliminary results and illustrates some useful techniques for analysing data of the type utilized, but the main contribution is in suggesting what information might be collected in the future and what further analyses might be performed. The existing data sets have in no way been fully exploited.

I wish to express my appreciation to the many persons who have aided in the preparation of this Study at one stage or another. H. Buckley, J. Lewis, I. McCredie, N. Tandan, E. Van der Walt, B. Nemes, and J. Boucek of Statistics Canada provided access to the data and aided in its interpretation. B. Lacombe, K. Newton, and D. Wakid of the staff of the Economic Council of Canada provided valuable comments on earlier working papers. J. Serjak, D. Barrett, and M. McPhail, also of the staff of the Economic Council, did much of the statistical work, and, functioning as my research assistant, R. Rubio de Urquia aided in setting up the econometric model of Chapter 4. Most of the typing was performed by the secretarial pool at the Council. B. York typed one draft.

I must acknowledge my special appreciation to Arthur J.R. Smith, former Chairman, and S. Ostry, Director, of the Economic Council. Dr. Ostry was instrumental in assuring that the source data were collected in the first place, in allowing me to gain access to the data, and she provided many insights regarding fruitful ways to analyse the question of search behaviour. It is certainly not an overstatement to note that, without Dr. Ostry's assistance, this Study could never have been performed.

Any errors in the Study are, of course, the responsibility of the author alone.

CHAPTER 1

INTRODUCTION

Considerable attention has been devoted in economics literature in recent years to the question of how job seekers and vacant jobs are matched in a free labour market. This interest derives primarily from a desire to effect certain desirable changes in macroeconomic variables -- notably rates of inflation and unemployment -- by improving the efficiency, or speed, of the matching process. Charles Holt has stated the point as succinctly as anyone:

> "...we can simply list the changes that could be influenced by policy actions to reduce unemployment (and vacancies) without increasing inflation:
>
> 1. Improving the information, search processes, and counseling of workers and employers...."[1]

While most of this literature has dealt with the Phillips' curve or some sort of derived "trade-off" relationship, "it is important that manpower programs ... are equally suitable whether or not a steady-state Phillips curve is thought to exist. In one case, equilibrium unemployment is reduced and in the other, the Phillips curve is moved to the left."[2]

Despite the focus on macroeconomic variables, much of the literature has dealt, in a theoretical sense, with microeconomic behaviour, under the argument noted by Phelps: "It seems clear that macroeconomics needs a microeconomic foundation."[3] Although much work remains to be done in

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[1]Charles C. Holt, "Improving the Labor Market Trade-Off Between Inflation and Unemployment", *American Economic Review*, May 1969, p. 142.

[2]*Ibid.*, p. 141.

[3]Edmund S. Phelps, "Introduction: The New Microeconomics in Employment and Inflation Theory", in E. S. Phelps, *et al.* (eds.), *Microeconomic Foundations of Employment and Inflation Theory* (New York: Norton & Co., 1970), p. 2.

developing the microeconomic theory of search behaviour in the labour market, it appears at this point in the development of research on the topic that what is most urgently needed is some empirical work to provide evidence regarding the validity of the theoretical hypotheses already advanced.[1] Thus most of this Study is concerned with reporting some survey results on employer and worker search behaviour, and with analysing these data. One central focus of concern is the selection of search methods by workers and employers. If the reasons underlying this selection were understood, it would be much easier to specify the form of public intervention in the job market that would be most effective in improving efficient operation.

Preceding presentation of empirical results, the following two sections present some theoretical considerations regarding, respectively, worker and employer search behaviour. No argument is made that these considerations are original, as the numerous footnotes will attest, nor is any claim made that they represent an exhaustive survey of the literature or a full integration of the various theories that have been developed. Rather, the theoretical sections attempt to present a background sufficient to explain the rationale behind the empirical tests conducted in later sections, referencing this to selected works in the literature.

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[1]This is not to imply that no empirical work is available, but rather that developments in this area appear to be lagging. For examples of empirical studies, see Albert Rees and George P. Shultz, *Workers and Wages in an Urban Labor Market* (Chicago: University of Chicago Press, 1970); Harold L. Sheppard and A. Harvey Belitsky, *The Job Hunt* (Baltimore, Md.: The Johns Hopkins Press, 1966); and a number of studies cited in Charles C. Holt, "Job Search, Phillips' Wage Relation, and Union Influence: Theory and Evidence", in Phelps, *et al.* (eds.), *Microeconomic Foundations*, pp. 95-108. No similar studies have been published using Canadian data.

CHAPTER 2

THEORETICAL CONSIDERATIONS REGARDING WORKER SEARCH BEHAVIOUR

The basic tenet of the theory of worker search behaviour is that what is really sought is *information* about job openings, rates of pay, and other terms and conditions of work. Additional information has potential value in that it may enable a worker to obtain a job or, possibly, to obtain what he views as a more desirable job than he could have obtained otherwise. However, obtaining additional information is costly, which presents the job seeker with an optimization problem. Under certain assumptions, optimal behaviour implies that "a worker will search for wage offers ... until the expected marginal return equals the marginal cost of search".[1] This basic tenet has been extended by several writers to provide a wealth of testable hypotheses. Thus Alchian argues that specialization in information-gathering may be efficient: "If seeking information about other jobs while employed is more costly than while not employed, it can be economic to refuse a wage cut, become unemployed, and look for job information."[2] These same efficiencies through specialization provide a rationale for the growth of brokers and middlemen,[3] and for the use of these intermediaries by job seekers. Most empirical studies have emphasized the importance of informal methods of job search,[4] but it may be noted that "of course, not all job seekers have access to informal sources, and those who are most disadvantaged, such as Negroes and

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[1]George J. Stigler, "Information in the Labor Market", *Journal of Political Economy*, October 1962 (Supplement), p. 96. See also George J. Stigler, "The Economics of Information", *Journal of Political Economy*, June 1961, pp. 213-25.

[2]Armen A. Alchian, "Information Costs, Pricing, and Resource Unemployment", *Western Economic Journal*, June 1969, pp. 110-11.

[3]*Ibid.*, p. 112.

[4]See, for example, Rees & Shultz, *op. cit.*, Chapter 13.

recent migrants to the area, will have less access to them than others".[1] It can also be argued along similar lines that persons who have been unemployed for long periods of time will tend to have disproportionate numbers of other persons who have been unemployed for long periods of time in their circle of acquaintances. These persons will thus be more likely than other job seekers to use formal intermediaries, since their informal channels of communication are not as useful.[2] It would seem logical that the search behaviour of persons with dependants would differ from that of persons without dependants, of persons with financial resources to sustain them in a prolonged period of search from those without such resources, of those receiving unemployment insurance benefits from those not receiving such benefits.[3]

It is not only the characteristics of the job seekers that influence their search behaviour, but the characteristics of the market in which they are seeking. In tight labour markets, characterized for concreteness of definition by large numbers of job vacancies and low levels of unemployment, workers would not be expected to use high-cost methods of search such as private agencies where they must pay fees. In slack labour markets the reverse would be true.[4] Dynamic factors play a part. "The more rapidly 'the' equilibrium wage rate changes, the smaller the returns from search and hence the smaller the amount of search that will be undertaken...."[5]

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[1] *Ibid.*, p. 213.

[2] Peter B. Doeringer and Michael J. Piore, in *Internal Labor Markets and Manpower Analysis* (Lexington, Mass.: D. C. Heath & Co., 1971), p. 102, discuss the use of "recruitment procedures as a screening device".

[3] See M. W. Reder, "The Theory of Frictional Unemployment", *Economica*, February 1969, p. 12, on the determinants of "fussiness".

[4] See, for example, the argument in Joseph C. Ullman and David P. Taylor, "The Information System in Changing Labor Markets", *Proceedings of 18th Annual Winter Meeting*, Industrial Relations Research Association, Madison, Wis., 1965, p. 277.

[5] Stigler, "Information in the Labor Market", p. 97.

Finally, the literature contains a small number of mathematical models of search behaviour. McCall develops a dynamic programming model which shows that, under a certain set of assumptions, "the optimal policy for the job searcher is to reject all offers below a single critical number".[1] Holt presents a model that shows how the wage aspiration level of the job seeker changes over time (duration of unemployment).[2] An attractive theory can be formulated by combining these two approaches. Although a full integration is not provided herein, the salient aspects are highlighted.

To simplify the exposition, let us define the following notation. Let C = the cost of search per time period that is required to generate the desired number of offers per period, using the most efficient combination of methods of search (concept to be further developed later). Let X = a random variable denoting the maximum job offer per period,[3] and $\phi(X)$ = the probability density function of X. It is assumed that X represents the total utility stream available from accepting the particular offer, measured over the expected tenure of employment and suitably discounted. To eliminate the distortions introduced by considering both "temporary" and "permanent" jobs, it is convenient to assume that all job offers have the same expected tenure. Finally, define $f(X)$ to equal the maximum net return obtainable when job offer X has just been received. The nature of the f function may be clarified by noting that if an offer received in the N-th period is accepted, then $f = X_N - CN$. More generally, if we let X_n denote the maximum offer received in the n-th period, then

$$(2.1) \quad f(X_n) = -Cn + \max \left\{ X_n, E[f(X)] \right\}$$

where the symbol E is the mathematical expectation operator. The optimal policy for the job seeker is then to

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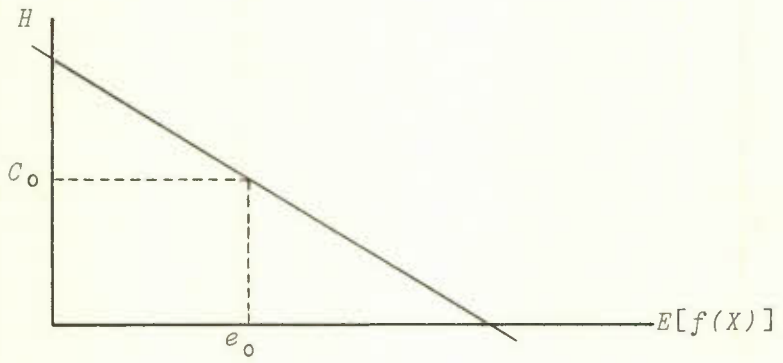
[1] J. J. McCall, "Economics of Information and Job Search", *Quarterly Journal of Economics*, February 1970, p. 115.

[2] Holt, "Job Search...", p. 63.

[3] All of this is essentially McCall's "simple" model, as he terms it, with one or two minor modifications. I am following McCall in assuming X is measured in utility, rather than dollar, terms. See McCall, *op. cit.*, p. 116.

continue searching if $X_n < E[f(X)]$, and to accept the offer if $X_n \geq E[f(X)]$. This can be shown to lead to the condition that C, the marginal cost of seeking for an additional period, is equated to the expected marginal return from waiting another period.[1] Further, this last term -- call it H -- can be shown to be a strictly decreasing function of $E[f(X)]$. Since H and C are measured in commensurate units, they can be represented on the same axis, allowing the graphical analysis of Figure 1.

Figure 1



If an individual's expected return from remaining unemployed is given by e_0, he will search only if search cost is less than or equal to C_0. The model can thus explain the behaviour of the "discouraged worker".[2] Similarly, if we assume that the expected return from remaining unemployed declines as the duration of unemployment increases, the model is compatible with procrastination in the initiation of search activity, even with static (and correct) expectations regarding $f(X)$. For example, if the costs of search are C_0 per period, and the expected return from remaining unemployed is greater than e_0 for the first few days of unemployment but eventually declines to e_0 or less after, say, a week, the worker will not begin search until a week has elapsed. We are here discussing movements along a fixed H function.

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[1] For derivation, see *ibid.*, pp. 116-17.

[2] *Ibid.*, p. 119.

There are several means of introducing the concept of declining wage aspirations into this model.[1] The simplest approach, the one most in harmony with Holt's assumptions and one that does not cause declining aspirations to be evidence of nonoptimal behaviour, is to relax the assumption of McCall's "simple" model that "the searcher is assumed to know both the distribution of wages for his particular skills and the cost of generating a job offer".[2] Holt's proposition is that:

> "Initially the aspiration level is set high to protect the worker from the risk of selling himself short by accepting the first job that comes along - unless it is a very good one. Then, as knowledge accumulates about the universe being sampled, the aspiration level is lowered."[3]

The assumption herein is that the worker does not know the $\phi(X)$ distribution initially, and to "protect himself", he assumes it such as to yield a relatively high $E[f(X)]$. As search progresses, he revises his subjective estimate of the $\phi(X)$ distribution downward towards reality; i.e., a type of "learning" takes place, causing shifts in the H function and leading to a higher probability of accepting a given offer.

An important type of declining aspiration level may be the increased willingness to accept "temporary" or even "casual" (e.g., day labour) employment as unemployment duration increases. Certain groups in the labour force -- for example, some females -- may have aspiration level patterns that differ from those of other workers

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[1]It is understood that "wages" (X in the notation of the model) are still measured in utility terms and include other characteristics of the job in addition to money wage rates. In this sense, I am referring not so much to Holt's concept of declining (money) wage aspirations as I am to a decline in Reder's concept of "fussiness".

[2]McCall, *op. cit.*, p. 115. McCall himself relaxes this assumption at a later point in his paper.

[3]Holt, "Job Search...", p. 62.

simply because of their "looser" attachment to the world of work and/or shorter periods of expected tenure in any given job.

The aspiration level proposition is not developed herein in the form of a mathematical model. The interested reader is referred to McCall's "adaptive search model",[1] where the notation is developed but implications are not discussed. Strictly speaking, McCall's adaptive search model is very general, and includes declining aspiration levels only as a special case.

The major implication of including declining aspiration levels in a theory of search behaviour is that increasing the availability of job market information may decrease the average length of frictional unemployment. Under McCall's "simple" model, increasing the availability of job market information will, because it lowers search costs, reduce the incidence of the discouraged worker phenomenon. The implication of the "simple" model is, however, that lower search costs would *increase* the expected length of frictional unemployment.[2] Under the declining aspirations approach, the job seeker will spend less time operating under unrealistically high aspirations, because the additional information will give him a better idea of the true $\phi(X)$ distribution. This should reduce the average duration of frictional unemployment. Note, however, that the magnitude of this reduction for a given expenditure on increasing information is unknown. Any policy recommendations based upon arguments similar to those stated above, which have not quantified the relevant costs and benefits, must be regarded as purely subjective.[3]

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[1] McCall, *op. cit.*, pp. 125-26.

[2] See *ibid.*, p. 119, for the formula giving the expected length of frictional unemployment.

[3] See Dennis R. Maki, *Research and Experimentation in Labour Market Search Behaviour*, Economic Council of Canada Special Study No. 21 (Ottawa: Information Canada, forthcoming), for an approach to measuring the reduction in the average duration of frictional unemployment brought about by increased information.

Since much of the analysis of Chapter 4 deals with the selection and total number of search methods used by different groups of workers, it is instructive to consider the factors that influence these decisions. It was previously noted that C, the cost of search per time period, was itself the result of an optimizing decision. Notationally, let $C = \Sigma B_i Z_i$, where i indexes discrete methods of search such as contacting Canada Manpower Centres, contacting employers directly, and getting information from friends and relatives.[1] Let Z_i be a variable measuring the level of activity of the i-th search method per time period -- e.g., the number of employers contacted directly -- and B_i the cost of pursuing the i-th search method at a unit level -- e.g., contacting one employer. Efficiency in search then dictates that the job seeker minimize

$$(2.2) \quad M = \Sigma B_i Z_i + \lambda[K - \Sigma P_i Z_i],$$

where λ is an undetermined Lagrange multiplier and P_i is the probability of generating a job offer using the i-th search method at a unit level. The number of job offers it is desired to receive per time period is denoted as K and may be most conveniently thought of as an integer greater than or equal to unity, although this is not necessary. If the P_i are assumed to be constants, invariant with respect to scale, this optimizing problem has a very simple solution -- too simple in fact to be useful. The job seeker will use only one search method, the one with the highest P_i/B_i ratio.

One can introduce greater realism into this submodel by making P_i a function of Z_i.[2] The job seeker then minimizes

$$(2.3) \quad M = \Sigma B_i Z_i + \lambda[K - \Sigma P_i(Z_i) Z_i].$$

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[1] See Appendix A for a more complete listing of possible search methods.

[2] Alternatively (or in addition) one could make B_i a function of Z_i. The modification presented in the text is sufficient for my purpose.

The first-order conditions are:

$$(2.4) \quad B_i - \lambda[P_i + Z_i \, dP_i/dZ_i] = 0 \quad (i = 1,2 \ldots q)$$

$$(2.5) \quad K - \Sigma P_i Z_i = 0$$

which yields a system of $q + 1$ equations in $q + 1$ unknowns (the Z_i and λ) that must be solved simultaneously.[1] It is now entirely possible, as long as $dP_i/dZ_i \leq 0$, which is assumed, that more than one search method will be used. Those job seekers who desire to receive more offers (have a larger K) are more likely to use more methods. Different job seekers, particularly if they work in different occupations, for example, will use different combinations of methods because they have, or think they have, different sets of P_i. This admittedly provides for a weak set of testable hypotheses, in that the theory allows for different behaviour between individuals, but does not necessarily explain it. *If* data were available (and it is conceptually possible to collect such data) on the P_i and B_i for different groups of individuals, one could test to see if behaviour is compatible with the model, assuming individuals are aware of the P_i and B_i magnitudes. To my knowledge, such data do not exist at present.

Since we have already introduced dynamics into the model by allowing for declining wage aspiration, we could allow for "learning" to take place regarding the P_i functions. This is an unnecessary complication at present, but it is surely heroic to assume that workers know the nature and parameters of the P_i functions. It is interesting to speculate how much the "efficiency" of job search would be improved if an educational program were mounted (say, through the media of television and newspapers), giving job seekers more information about what methods of search are most effective.

One deficiency of the model presented is that the effect of budget constraints is not clearly isolated. Provision is made for a worker to cease search and become "discouraged" if, at his e_0 (Figure 1), his H function is such that $E[f(X)]$ is less than search costs. Another reason for this type of behaviour could be a budget

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[1]The second-order conditions are not developed herein.

constraint that precludes spending the amount C per time period in search. In the extreme case, this would be exemplified by the worker not having carfare to get "downtown"; in less extreme cases it might mean that some effective but costly method of search cannot be utilized. Recognition that this could be a problem has led to the exploratory grants included in the Canadian Manpower Mobility Program.[1] This could be handled by adding a budget constraint in equation 2.3, also considered an unnecessary complication in the present exposition. Alternatively, one could follow Holt's suggestion and allow for "systematic influences on aspiration levels and its rate of adjustment by dependents, financial resources, personality, age, education...."[2] This is the approach followed herein, without developing the full mathematical model. The worker's *perceived* $\phi(X)$ function is assumed to depend upon the length of time he has been unemployed and upon certain of his characteristics (age, sex, education, financial resources, and so forth), as well as the state of the market in which he is seeking. The "independent variables" in this relation are not themselves independent of one another. For example, the influence of financial resources on the perceived $\phi(X)$ function is dependent upon the duration of unemployment. One influence of worker characteristics that merits underscoring is the difference in expected tenure of employment among age groups, occupation groups, and so forth.

Because of the number of factors affecting search behaviour and the complex interrelationships among these factors, it is very difficult to formulate concrete hypotheses of the form; e.g., more highly educated workers will have a longer expected duration of search or will use a larger number of distinct methods of search. The theory is useful mainly in isolating the factors that

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[1]See Economic Council of Canada, *Eighth Annual Review, Design for Decision-Making: An Application to Human Resources Policies* (Ottawa: Information Canada, 1971), p. 146, for a brief description of exploratory grants.

[2]Holt, "Job Search...", p. 97.

may be expected to be important and in highlighting the fact that the relationships among these factors *are* very complex. As more empirical analyses are done, the common results of several studies will furnish a set of uni-directional hypotheses for further testing. This is essentially an argument in favour of the inductive method which some would term as bad methodology; but in an area where as little is known as in the area of search behaviour, it appears to be the only operational methodology.

CHAPTER 3

THEORETICAL CONSIDERATIONS REGARDING EMPLOYER SEARCH BEHAVIOUR

Many of the basic points made regarding worker search behaviour also have a counterpart on the employer side of the job market, notably the idea that what is really "sought" is information about the availability of workers and where they may be contacted, and that this information has a value and can only be obtained at a cost. The employer searches for workers for two reasons: (a) to replace those who quit, and (b) to expand his work force when it is more economical to do so than to have his current employees work overtime. The employer searches for workers until the expected marginal return equals the marginal cost of search, but this calculation is complicated because the employer may pursue a course of action other than that of increasing search activity. The most important alternative is to pay relatively higher wages,[1] thereby reducing search costs because employees will seek out the employer. Note that the job seeker does not have a corresponding strategy; if he decides to offer his services at a wage lower than "standard", the onus is still on him to communicate this to prospective employers; i.e., he must engage in "search". This is part of what Stigler calls the identification problem; "the fraction of wasted search will be much smaller for a steelworker than for a steel company",[2] because there are more potential steelworkers than potential employers of steelworkers.

Ullman has noted that employers have a third strategy in that they can attempt to fill skilled vacancies through training programs and a policy of promotion from within. Their search activity is thus limited to essentially unskilled workers, who are generally "easier" to find than persons possessing specific skills, for a number of obvious reasons.

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[1]The concept is introduced by Stigler in "Information in...", p. 102, and further developed by Joseph C. Ullman, "Interfirm Differences in the Cost Search for Clerical Workers", *Journal of Business*, April 1968, pp. 153-65.

[2]Stigler, "Information in...", p. 102.

These ideas can be integrated into a formal static model.[1] For simplicity, consider the employer as being able to hire only two classes of workers, skilled and unskilled. Within a class, workers are assumed to be homogeneous with regard to their productive capacities, but it is possible to transform unskilled workers to skilled through training. Let us define the following notation:

-- *MNC* denotes manning cost, defined by equation 3.1 as the sum of search costs, wage costs, and training costs, where the training is undertaken as an alternative to hiring new workers. If the employer provides or finances any other type of training -- e.g., "fringe-benefit-type" nonskill training -- this is excluded from *MNC*. Any expenditures on "orientation-type" training are included in search costs.

-- *SC* refers to search costs, using the most efficient combination of methods of search.

-- *V* denotes number of vacancies, which is partly determined by exogenous factors (growth in total employment within the firm is exogenous in this static model) and partly by endogenous factors that affect labour turnover.

-- *W* denotes wage rates.

-- *TC* denotes training costs.

-- *WC* denotes wage cost, measured as the present value of expected wage payments over the expected duration of employment, including any indirect effects, such as increases in wages to current employees necessitated by "inducement wages" offered to prospective employees.

-- the subscripts *U* and *S* refer to unskilled and skilled, respectively.

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[1]The model presented draws heavily on Ullman, *op. cit.*, and Walter Y. Oi, "Labor as a Quasi-Fixed Factor", *Journal of Political Economy*, December 1962, pp. 538-55.

-- r denotes the proportion of skilled vacancies to be filled by training unskilled workers -- a parameter under the employer's control.

The employer is then faced with the following sort of manning cost function:

$$(3.1)\quad MNC(V_S, V_U, r) = SC_S[(1-r)V_S(W_S),\ W_S] + SC_U\{V_U[rV_S(W_S), W_U], W_U\} + TC[rV_S(W_S)] + WC_S[V_S(W_S), W_S] + WC_U[V_U(W_U), W_U].$$

Verbally interpreting this equation, it states that search costs for skilled workers depend upon the number of skilled vacancies filled through outside search -- itself a function of the parameter r and the total number of skilled vacancies, which is in turn a function of the skilled wage rate because higher wages should reduce quits and hence vacancies -- and the skilled wage rate because higher wages offered cause search costs per vacancy to decline. In the extreme case where the employer offers very high wages, he will have a pool of unsolicited applicants causing pure "search" costs to be zero. He will still have some costs in screening, processing, and orientation -- categories of cost herein included in SC. Search cost for unskilled workers is a similar sort of function, complicated by the fact that the filling of a vacancy for a skilled worker "creates" a vacancy for an unskilled worker, since trainees are assumed to be drawn from the ranks of the currently employed unskilled workers. Training cost is a generalized function of the number of persons trained, allowing for scale economies and diseconomies in training. The wage cost components of manning cost are written as generalized functions of the number of vacancies to be filled and the wage rates paid.

Denote the present value of the expected marginal revenue product of a worker, measured over the expected duration of employment, as MRP^*. The employer will then attempt to fill vacancies (in another sense, vacancies will exist) until:

$$(3.2) \quad \delta MNC/\delta V_U = \delta SC_U/\delta V_U + \delta WC_U/\delta V_U = MRP^*_U.$$

$$(3.3) \quad \delta MNC/\delta V_S = (1-r)\,\delta SC_S/\delta V_S + r\delta SC_U/\delta V_U.\delta V_U/\delta V_S + r\delta TC/\delta V_S + \delta WC_S/\delta V_S = MRP^*_S.$$

The employer chooses optimal wage rates under the constraint that (3.2) and (3.3) are satisfied, which requires first that:

$$(3.4) \quad \delta MNC/\delta W_U = \delta SC_U/\delta V_U.\delta V_U/\delta W_U + \delta SC_U/\delta W_U + \delta WC_U/\delta V_U.\delta V_U/\delta W_U + \delta WC_U/\delta W_U = 0.$$

$$(3.5) \quad MNC/\delta W_S = (1-r)\,\delta SC_S/\delta V_S.\delta V_S/\delta W_S + \delta SC_S/\delta W_S + r\delta SC_U/\delta V_U.\delta V_U/\delta V_S.\delta V_S/\delta W_S + r\delta TC/\delta V_S.\delta V_S/\delta W_S + \delta WC_S/\delta V_S.\delta V_S/\delta W_S + \delta WC_S/\delta W_S = 0.$$

Substituting (3.2) into (3.4) and (3.3) into (3.5) yields the two conditions:

$$(3.6) \quad MRP^*_U\delta V_U/\delta W_U + \delta SC_U/\delta W_U + \delta WC_U/\delta W_U = 0.$$

$$(3.7) \quad MRP^*_S\delta V_S/\delta W_S + \delta SC_S/\delta W_S + \delta WC_S/\delta W_S = 0.$$

Interpreting these conditions verbally, it is seen that the employer reaches an optimal position when the sum of the expected marginal revenue product from reduced turnover, and the saving in search costs, both of which are caused by higher wage rates, is equal to the resulting total increase in wage costs.

$$(3.8) \quad \delta MNC/\delta r = \delta SC_S/\delta r + \delta SC_U/\delta V_U.\delta V_U/\delta r + \delta TC/\delta r = 0.$$

The employer would continue to increase r, the proportion of skilled vacancies filled by training unskilled workers, until the saving in search costs for skilled workers is equal at the margin to the increase in search costs for unskilled workers plus training costs.

One could perform considerable additional mathematical manipulation of this model,[1] but this is not pursued herein. Several hypotheses are suggested by the model, at least if one is willing to make some additional assumptions. For example, employers who pay "high" wages should have "low" search costs. Possibly unions that operate hiring halls and screen workers before referral to the employer can therefore negotiate higher wage rates than would otherwise be the case. However, unionized employers in a situation where the union does not operate a hiring hall should *ceteris* (particularly wage rates) *paribus*, incur greater than average search cost because they cannot practise wage discrimination, causing $\delta WC/\delta W$ to be "large".

Employers with low separation rates should incur greater than average search costs because the expected tenure of employment is long, causing MRP^* to be "high". Although the rigidly "money-oriented" model above does not make this explicit, employers who provide training, and promote from within, may incur lower search costs for unskilled workers than would be the case for other employers because potential workers may view W in terms of longer-term potential, and include an estimate of the probability of being trained and "promoted" in their calculations. Note that the "training" discussed may be of the very informal variety usually referred to as "experience".

Since one major area of concern in this Study is with the selection of search methods, it may be instructive to set up a submodel for this decision process. A simple Lagrangian model, similar to that presented in Chapter 2, will suffice with minor modification. Let us define the following notation:

-- Y_i represents the number of times that vacancies for a specific type of worker (skilled versus unskilled) are listed with search method i.

[1] Notably one could derive the second-order conditions and derive formulas for expressions such as $\delta r/\delta W_S$.

-- N represents the total number of applicants desired, which will usually be greater than the number of vacancies. Note that "more" is not preferred to "less"; I assume there exists an "optimal" N.

-- Q_i represents the number of applications received by utilizing method i at a unit level (one advertisement in a newspaper, etc.).

-- Q_i is assumed to be a function of Y_i, with $\delta Q_i / \delta Y_i \leq 0$.

-- D_i is the cost of utilizing search method i at a unit level.

At a given level of wages and with a given number of vacancies, the employer would then minimize:

$$(3.9) \quad L = \Sigma D_i Y_i - \psi[N - \Sigma Q_i(Y_i) Y_i]$$

with respect to Y_i, leading to first-order conditions identical in form to (2.4) and (2.5), expressed in different notation.[1]

D_i will vary among employers, since it includes recruitment, screening, and orientation costs. Employers who have established screening capacity within the firm may find it desirable to use, say, newspaper advertising, while other firms identical in all other respects may utilize intermediaries. Q_i will also vary among employers, since Q_i is expected to be larger for employers who pay "higher" wages. Because of the interrelations among D_i, W, and the volume of vacancies, the marginal cost of utilizing different search methods will vary widely among employers. This makes it very difficult to categorize

[1] As was noted regarding the worker model in footnote 2 on page 9, we could here make D_i a function of Y_i without changing the implications of the conditions for our purposes.

search methods into "high-cost" and "low-cost" groupings, interpreting search costs as they are defined herein.[1]

Further, most search method categories are not pure types. Consider newspaper advertising, for example. If an employer feels that a simple notice of vacancy would elicit a larger than optimal number of applications, he can attempt to arbitrarily restrict the number of applicants by inserting a phrase such as "high school graduates only". Indeed, Rees argues that many of the qualifications attached to jobs exist for this purpose only -- i.e, to reduce the number of applicants -- and have little to do with the actual requirements of the work.[2] In any event, it should be noted that employers have some control over the Q_i functions, a factor that is not recognized in the model.

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[1]I do not find it useful to view recruitment costs in isolation, when the different recruitment methods imply different screening costs. Rees notes, for example, that "...low-wage employers are therefore forced to use high-cost information channels, such as newspaper advertising and private agencies". If screening costs are high for unsolicited "walk-ins", methods such as noted above may not be high-cost in the overall view. See Albert Rees, "Information Networks in Labor Markets", *American Economic Review*, May 1966, p. 563.

[2]*Ibid.*, p. 561.

CHAPTER 4

EMPIRICAL EVIDENCE ON WORKER SEARCH BEHAVIOUR

The data utilized in this chapter consist of the replies to a questionnaire appended to the January 1969 Labour Force Survey conducted by the Dominion Bureau of Statistics. All persons who had been unemployed for a cumulative total of five or more weeks during the calendar year of 1968 were requested to complete the special questionnaire, giving information on their search behaviour and success in finding employment during their longest continuous spell of unemployment in 1968. A more complete description of the data base is included in Appendix A.

The main portion of the analysis in this chapter consists of the estimation of a simple econometric model using a subsample of 931 micro-observations.[1] The model itself is recursive in nature, the hypotheses being that (1) the probability of finding a job depends upon how the worker searches and how hard he searches, and upon certain of his personal characteristics, and (2) how he searches and how hard he searches are further dependent upon his personal characteristics. Note that characteristics such as education and occupation, for example, may also be proxies for the state of demand in the market.

More formally, the basic model is:

$$(4.1)\quad JFY = f(NMS, MS, JOB\ TYPE, SEX, AGE, ED, MARS, REGION, OCC, IND)$$

$$(4.2)\quad NMS = f(SS, JOB\ TYPE, SEX, AGE, ED, MARS, REGION, OCC, IND)$$

$$(4.3)\quad CMC = f(JOB\ TYPE, SEX, AGE, ED, MARS, REGION, OCC, IND)$$

$$(4.4)\quad PRIVAG = f(JOB\ TYPE, SEX, AGE, ED, MARS, REGION, OCC, IND)$$

[1] Approximately a one-in-four systematic subsample.

(4.5) $LOCEMP = f(JOB\ TYPE, SEX, AGE, ED, MARS, REGION, OCC, IND)$

(4.6) $LOCPAP = f(JOB\ TYPE, SEX, AGE, ED, MARS, REGION, OCC, IND)$

(4.7) $FR\&REL = f(JOB\ TYPE, SEX, AGE, ED, MARS, REGION, OCC, IND)$

where:

-- *JFY* is a dummy variable = 1 if a job was found; zero otherwise.

-- *NMS* is the number of different search methods used.

-- *MS* is vector notation for method of search (the dependent variables in equations 4.3 - 4.7 are examples of different methods of search).

-- *JOB TYPE* = 1 if the worker returned to a former job; zero otherwise.

-- *SEX* = 1 for females; zero for males.

-- *AGE* is a set of three dummy variables.

-- *ED* is education, a set of three dummy variables.

-- *MARS* is marital status = 1 if married; zero otherwise.

-- *REGION* is a set of five dummy variables for the five economic regions of Canada.

-- *OCC* is occupation = 1 for white-collar; zero otherwise.

-- *IND* is industry, a set of three dummy variables.

-- *SS* is search status = 1 for those workers who used no search methods (did not look); zero otherwise.

-- *CMC* is the search method of consulting Canada Manpower Centres = 1 if method was used; zero otherwise.

-- *PRIVAG* is the search method of consulting private employment agencies = 1 if method was used; zero otherwise.

-- *LOCEMP* is the search method of contacting local employers without (generally) prior knowledge of a job vacancy = 1 if method was used; zero otherwise.

-- *LOCPAP* is the search method of placing or answering advertisements in local newspapers = 1 if method was used; zero otherwise.

-- *FR&REL* is the search method of consulting friends and relatives = 1 if method was used; zero otherwise.

The dependent variables for all but equation 4.2 are dummy variables, which causes biased estimates of the coefficients,[1] given that all coefficients are estimated by ordinary least squares. The results are presented in Tables 1 through 14, with a short verbal interpretation following each set of tables. Those readers who are interested in the statistical validity of the tests performed are referred to Appendix B, where the details of the method used are explained.

Tables 1 through 4 present the results of estimating two versions of equation 4.1. The equation in Table 1 differs from that in Table 3 in that the factor "Methods of Search" is not included in the latter version.[2]

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[1]See A. S. Goldberger, *Econometric Theory* (New York: Wiley & Sons, 1964), p. 249. No correction was attempted for this.

[2]The two versions are included because *NMS* and *MS* are strongly correlated (one is almost the sum of the other set; singularity in the X^tX matrix is avoided by including more than one method of search in "other", in the set of methods used in Table 1). The result of this correlation is apparent in comparing the standard error of *NMS* in Tables 1 and 3; it increases by a multiplicative factor of over five when *MS* is added to the equation.

Table 1

REGRESSION RESULTS,
DEPENDENT VARIABLE = 1 IF JOB FOUND,
ZERO OTHERWISE

(Methods of Search included)

Factor	Partial F ($d.f.$)	Estimated Coefficient	Standard Error	Variable Mean(1)	Adjusted Coefficient
Intercept		.0787	.0501	.5375	.3757
Σ Methods	55.24*(1,929)	.0498	.0325	3.2509	.0498
Methods of Search	2.97*(7,922)				
CMC		-.0898	.0407	.7604	-.0885
Private agencies		-.0520	.0438	.1768	-.0507
Local employers		.0994	.0407	.6738	.1007
Friends and relatives		.0268	.0402	.5781	.0281
Local newspapers		-.0296	.0416	.2948	-.0283
Outside employers and newspapers		.0044	.0400	.3576	.0057
Letters		-.0076	.0412	.2841	-.0063
Other				.1253	.0013
Job Type	19.51*(1,921)				
Former		.2048	.0303	.1432	.1755
New or not stated				.8568	-.0293
Sex	.88 (1,920)				
Female		.0266	.0259	.2719	.0194
Male				.7281	-.0072
Age	10.49*(2,918)				
14-19				.2062	.0324
20-44		.0129	.0308	.5483	.0453
45+		-.1607	.0369	.2455	-.1283
Education	2.72 (2,916)				
Elementary				.3724	-.0400
Secondary		.0448	.0248	.5547	.0048
University		.2077	.0478	.0729	.1677
Marital Status	.05 (1,915)				
Married		.0210	.0247	.5411	.0096
Single & other				.4589	-.0114
Region	1.87 (4,911)				
Atlantic				.1151	-.0287
Quebec		-.0034	.0346	.4140	-.0321
Ontario		.0520	.0375	.2472	.0233
Prairie		.0239	.0449	.1040	-.0048
British Columbia		.1228	.0430	.1197	.0941
Occupation	11.10*(1,910)				
Blue-collar				.8301	-.0013
White-collar		.0074	.0323	.1699	.0061
Industry	16.96*(3,907)				
Not stated				.1869	-.2157
Primary		.1691	.0464	.0811	-.0466
Secondary		.2079	.0328	.3588	-.0078
Tertiary		.3415	.0329	.3732	.1258
	R^2 = .19		$\bar{R}^2$ = .18	n = 931	

*Indicates significance at .05 level.

(1) The Variable Mean column provides a profile of the subsample; e.g., 73 per cent of the sample was male. For those subsequent tables where the Variable Mean column is omitted, the same sample was used as in this table, and the same means apply.

Table 2

RESULTS OF PAIRWISE COMPARISONS FOR EQUATION IN TABLE 1

Factor	Level 1	Level 2	*t*
Methods of Search	CMC	Private agencies	.95
	CMC	Local employers	5.39*
	CMC	Friends and relatives	3.47*
	CMC	Local newspapers	1.57
	CMC	Outside employers and newspapers	2.95*
	CMC	Letters	2.33*
	CMC	Other	2.21*
	Private agencies	Local employers	6.65*
	Private agencies	Friends and relatives	2.12*
	Private agencies	Local newspapers	.59
	Private agencies	Outside employers and newspapers	1.50
	Private agencies	Letters	1.06
	Private agencies	Other	1.19
	Local employers	Friends and relatives	-1.87
	Local employers	Local newspapers	-3.65*
	Local employers	Outside employers and newspapers	-2.98*
	Local employers	Letters	-2.98*
	Local employers	Other	-2.44*
	Friends and relatives	Local newspapers	-1.61
	Friends and relatives	Outside employers and newspapers	- .72
	Friends and relatives	Letters	- .96
	Friends and relatives	Other	- .67
	Local newspapers	Outside employers and newspapers	.95
	Local newspapers	Letters	.93
	Local newspapers	Other	.71
	Outside employers and newspapers	Letters	- .34
	Outside employers and newspapers	Other	- .11
	Letters	Other	.18
Job Type	Former	New or not stated	-6.75*
Age	14-19	20-44	.42
	14-19	45+	-4.36*
	20-44	45+	-6.08*
Occupation	Blue-collar	White-collar	.23
Industry	Not stated	Primary	3.64*
	Not stated	Secondary	6.33*
	Not stated	Tertiary	10.37*
	Primary	Secondary	.96
	Primary	Tertiary	4.11*
	Secondary	Tertiary	5.12*

*Indicates significance at .05 level.

Table 3

REGRESSION RESULTS,
DEPENDENT VARIABLE = 1 IF JOB FOUND, ZERO OTHERWISE

(Methods of Search excluded)

Factor	Partial F $(d.f.)$	Estimated Coefficient	Standard Error	Adjusted Coefficient
Intercept		.0824	.0482	.3498
Σ Methods	55.21*(1,929)	.0486	.0059	.0486
Job Type	20.60*(1,928)			
Former		.2085	.0303	.1787
New or not stated				-.0298
Sex	.40 (1,927)			
Male				-.0024
Female		.0089	.0255	.0065
Age	11.45*(2,925)			
14-19				.0335
20-44		.0136	.0308	.0471
45+		-.1670	.0370	-.1335
Education	3.35*(2,923)			
Elementary				-.0431
Secondary		.0492	.0248	.0061
University		.2184	.0475	.1753
Marital Status	0.0 (1,922)			
Married		.0109	.0248	.0051
Single & other				-.0058
Region	1.97 (4,918)			
Atlantic				-.0290
Quebec		-.0031	.0346	-.0321
Ontario		.0458	.0376	.0168
Prairie		.0357	.0449	.0067
British Columbia		.1278	.0435	.0988
Occupation	9.40*(1,917)			
Blue-collar				.0011
White-collar		-.0068	.0321	-.0058
Industry	17.24*(3,914)			
Not stated				-.2214
Primary		.1743	.0465	-.0471
Secondary		.2177	.0330	-.0037
Tertiary		.3462	.0331	.1248
	R^2 = .17	$\bar{R}^2$ = .16	n = 931	

* Indicates significance at .05 level.

Table 4

RESULTS OF PAIRWISE COMPARISONS FOR EQUATION IN TABLE 3

Factor	Level 1	Level 2	*t*
Job Type	Former	New or not stated	-6.88*
Age	14-19	20-44	.44
	14-19	45+	-4.51*
	20-44	45+	-6.89*
Education	Elementary	Secondary	1.99*
	Elementary	University	4.60*
	Secondary	University	3.98*
Occupation	Blue-collar	White-collar	- .21
Industry	Not stated	Primary	3.75*
	Not stated	Secondary	6.61*
	Not stated	Tertiary	10.46*
	Primary	Secondary	1.07
	Primary	Tertiary	4.10*
	Secondary	Tertiary	4.94*

*Indicates significance at .05 level.

The results indicate that the probability of finding a job increases by about five percentage points for each additional method of search used, on the average. This finding is statistically significant[1] in Table 3, but not in Table 1, due to the multicollinearity previously noted.[2] Both equations indicate that persons aged 45 years and over are significantly less likely than younger persons to obtain employment. The probability of becoming employed increases with education, as noted in Table 4, but the partial *F* ratio is not significant when methods of search are included in the equation (Table 1). It is undeniable that the probability of finding employment increases with education, but as some of the following tables will show, the model attributes part of this increased success to the number and selection of search methods used by persons with different levels of education.

As expected, those persons who returned to a former job had a higher probability of finding a job than other persons. Overall, about 14 per cent of the persons in the sample returned to a previously held job. Sex, marital status, and region of residence did not significantly affect the probability of finding a job. The same is true of occupation, at least after the factor

[1]All tests of statistical significance in this Study are conducted at the .05 level.

[2]See footnote 2 on page 23.

"industry" is added to the equation. Persons with an industry category of "tertiary" were significantly more likely to have obtained employment than those with an industry category of "primary" or "secondary". This result is unfortunately compatible with two different hypotheses, since the "industry" reported for those unemployed on the survey date is industry of last attachment, while for those employed on the survey date, "industry" is industry of current employment. Thus it is possible that: (a) persons normally employed in tertiary industry are more likely to find employment than other persons, or (b) regardless of industry of normal attachment, those persons who accept jobs in the tertiary sector are more likely to obtain employment. To the extent that industry of normal employment and industry of current employment are correlated, the problem of interpreting the industry coefficients is reduced.

Regarding the methods-of-search factor in Tables 1 and 2, those persons using the method "local employers" had significantly greater success than those using any method other than "friends and relatives". Those using "friends and relatives", which was the next most successful method, had significantly greater success than those using "Canada Manpower Centres" or "private agencies". In interpreting these results, it must be remembered that most people used several methods (3.25 methods, on the average), and the means of analysis used in Table 1 does not isolate the method that actually produced the job. The full set of pairwise comparisons of methods is shown in Table 2.

Equation 4.2 is reported in Tables 5 and 6. The search status and job-type variables are included only to remove extraneous sources of variation not of current interest. All factors except marital status significantly affect the number of methods used. Males use more methods than females; those in the 20-44 age group use more methods than younger or older job seekers; and the number of methods used increases with education. The number of methods used increases by region as one moves across the country from east to west, with the overall result that job seekers in British Columbia use about 0.9 more methods than those in the Atlantic Region. White-collar workers use about 0.3 more methods than blue-collar workers.

Table 5

REGRESSION RESULTS,
DEPENDENT VARIABLE = Σ METHODS

Factor	Partial *F* (*d.f.*)	Estimated Coefficient	Standard Error	Adjusted Coefficient
Intercept		2.2620	.1693	3.2509
Search Status	93.03*(1,929)			
Never looked		-2.9908	.2289	-2.9056
Looked				.0852
Job Type	3.55 (1,928)			
Former		- .1760	.1115	- .1508
New or not stated				.0252
Sex	4.99*(1,927)			
Female		- .5294	.0919	- .3855
Male				.1439
Age	6.82*(2,925)			
14-19				- .2271
20-44		.3863	.1113	.1592
45+		.0623	.1344	- .1648
Education	47.37*(2,923)			
Elementary				- .4056
Secondary		.5810	.0893	.1754
University		1.1424	.1704	.7368
Marital Status	.31 (1,922)			
Married		.0248	.0899	.0114
Single & other				- .0134
Region	41.02*(4,918)			
Atlantic				- .3861
Quebec		.1098	.1257	- .2763
Ontario		.5377	.1360	.1516
Prairie		.8724	.1618	.4863
British Columbia		.9775	.1565	.5914
Occupation	7.55*(1,917)			
White-collar		.3174	.1163	.2635
Blue-collar				- .0539
Industry	3.13*(3,914)			
Primary		- .0399	.1687	- .1970
Secondary		.1891	.1195	.0320
Tertiary		.2478	.1200	.0907
Not stated				- .1571
	R^2 = .20	$\bar{R}^2$ = .19	n = 931	

* Indicates significance at .05 level.

Table 6

RESULTS OF PAIRWISE COMPARISONS FOR EQUATION IN TABLE 5

Factor	Level 1	Level 2	t
Search Status	Never looked	Looked	13.07*
Sex	Female	Male	5.76*
Age	14-19	20-44	3.47*
	14-19	45+	.46
	20-44	45+	-3.41*
Education	Elementary	Secondary	6.51*
	Elementary	University	6.70*
	Secondary	University	3.65*
Region	Atlantic	Quebec	.87
	Atlantic	Ontario	3.95*
	Atlantic	Prairie	5.39*
	Atlantic	British Columbia	6.24*
	Quebec	Ontario	4.46*
	Quebec	Prairie	5.86*
	Quebec	British Columbia	7.06*
	Ontario	Prairie	2.43*
	Ontario	British Columbia	3.34*
	Prairie	British Columbia	.66
Occupation	White-collar	Blue-collar	-2.73*
Industry	Primary	Secondary	1.56
	Primary	Tertiary	1.89
	Primary	Not stated	.24
	Secondary	Tertiary	.62
	Secondary	Not stated	-1.58
	Tertiary	Not stated	-2.06*

*Indicates significance at .05 level.

These findings should not be confused with the issue of search intensity, where we may define intensity as number of searches per unit time period. We have no data on how many times each search method -- e.g., local employers -- was utilized, nor do we have data on the total duration of the search effort. One would expect that there exists a trade-off between the number of methods used and the number of times any given method is used. Further, the longer the duration of the spell of unemployment, the larger the number of methods the job seekers would be expected to utilize at least once. This is partially intuitive, but can be derived as an extension of the theory of Chapter 2, in that as search duration increases, the job seeker is likely to revise downward his subjective evaluation of the P_i for the methods he has been utilizing, causing him to utilize different methods, and hence a larger cumulative number of different methods.

For these reasons, a complete test of the theory regarding the number of methods utilized is impossible with the data in hand, but at least some of the results are compatible with the theory, on an intuitive basis. For example, the theory indicates that the number of methods used should increase with the number of offers desired per time period. It seems reasonable that this latter magnitude should increase with the degree of "wage offer" dispersion prevalent in the market for the particular job seeker's skills, which should in turn increase with educational level, on the average.[1] Taken together, these pieces of *ad hoc* reasoning suggest that the number of methods used should increase with level of education -- a phenomenon exhibited by the data.

The following set of eight tables presents the results of estimating equations 4.3 through 4.7, which provides information on the characteristics of those persons using selected search methods. Not all search methods were analysed in this manner due to a combination of being quantitatively unimportant in the sample and/or of limited interest.

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[1]The matter is surely not as simple as suggested. The assertion is based on the assumption that an individual worker's choice set increases with education, for two related reasons. First, although highly educated workers may be excluded from some jobs because they are "overqualified", it is assumed that all workers can obtain some money wage offers at the prevailing minimum wage, and that the maximum "realistically expected" money wage offer increases with education. Thus the range of money wage offers increases with education. Second, within a given level of money wage offers, it is assumed that more highly educated workers have greater flexibility in choosing the type of work, location of employer, and other attributes of a job included in "fringe benefits and non-monetary terms and conditions of work". "Wage offers" is used here in the sense discussed in Chapter 2 -- i.e., all attributes of the job, measured in utility terms. Note that we are not, in the main, discussing those categories of workers -- e.g., medical doctors -- whose increased education leads to greater specialization. We are discussing primarily the difference between elementary and secondary education levels.

Table 7 shows that the users of Canada Manpower Centres (CMC's) do not differ significantly from other persons in the sample with respect to any of the characteristics considered.[1] This is partially due to the fact that most of the persons in the sample (76 per cent) used CMC's, but it is still evidence that CMC's are utilized by a broad spectrum of job seekers, at least among those job seekers unemployed for five or more weeks in 1968.

Table 8 presents similar analysis for private agencies. The only significant factors are education and occupation. Owing to the small number of comparisons required, a separate table of t values was not prepared, but the results are that white-collar workers are more likely to use private agencies than blue-collar workers ($t = 2.88$); persons with a university education are more likely to use these agencies than those with a secondary education ($t = 3.85$); there is no significant difference between elementary and secondary education levels ($t = 0.53$).

Tables 9 and 10 present results for the users of the search method "local employers". Referring particularly to Table 10, males are more likely to use this method than females; those in the middle-age group are more likely to use it than younger or older persons; and use increases with education.[2] Except for a transposition between British Columbia and the Prairie Region, use of the method "local employers" increases by region as one moves across the country from east to west.

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[1]Persons who returned to a former job are significantly less likely to use CMC's than other persons, but this is hardly an important finding.

[2]If one uses four education levels, separating those with "some secondary education but not completed" from those who "completed secondary", one finds the former group more likely to use local employers as a method of search than the latter. Both groups are more likely to use this method than those with an elementary education or less, and less likely than those with some university.

Table 7

REGRESSION RESULTS,
DEPENDENT VARIABLE = 1 IF CMC USED AS SEARCH METHOD,
ZERO OTHERWISE

Factor	Partial *F* (*d.f.*)	Estimated Coefficient	Standard Error	Adjusted Coefficient
Intercept		.6098	.0431	.7604
Job Type	5.21*(1,929)			
Former		-.0969	.0280	-.0830
New or not stated				.0139
Sex	.32 (1,928)			
Male				.0064
Female		-.0234	.0235	-.0170
Age	2.28 (2,926)			
14-19				-.0347
20-44		.0590	.0284	.0243
45+		.0096	.0343	-.0251
Education	1.35 (2,924)			
Elementary				-.0246
Secondary		.0452	.0228	.0206
University		-.0067	.0435	-.0313
Marital Status	.96 (1,923)			
Married		.0309	.0229	.0142
Single & other				-.0167
Region	1.34 (4,919)			
Atlantic				-.0895
Quebec		.0988	.0320	.0093
Ontario		.1263	.0347	.0368
Prairie		.0848	.0413	-.0047
British Columbia		.0719	.0399	-.0176
Occupation	.19 (1,918)			
Blue-collar				-.0050
White-collar		.0295	.0297	.0245
Industry	1.66 (3,915)			
Not stated				-.0003
Primary		.1072	.0431	.1069
Secondary		-.0090	.0305	-.0093
Tertiary		-.0139	.0307	-.0142
	R^2 = .03	$\bar{R}^2$ = .02		n = 931

* Indicates significance at .05 level.

Table 8

REGRESSION RESULTS,
DEPENDENT VARIABLE = 1 IF PRIVATE AGENCIES USED AS SEARCH METHOD,
ZERO OTHERWISE

Factor	Partial *F* (*d.f.*)	Estimated Coefficient	Standard Error	Adjusted Coefficient
Intercept		.1289	.0383	.1768
Job Type	2.81 (1,929)			
Former		-.0534	.0249	-.0458
New or not stated				.0076
Sex	.04 (1,928)			
Male				.0042
Female		-.0154	.0208	-.0112
Age	2.34 (2,926)			
14-19				-.0153
20-44		.0328	.0252	.0175
45+		-.0110	.0305	-.0263
Education	4.72*(2,924)			
Elementary				-.0031
Secondary		-.0107	.0202	-.0138
University		.1231	.0387	.1200
Marital Status	2.25 (1,923)			
Married		.0363	.0204	.0167
Single & other				-.0196
Region	2.28 (4,919)			
Atlantic				-.0008
Quebec		-.0332	.0284	-.0340
Ontario		.0087	.0308	.0079
Prairie		.0268	.0366	.0260
British Columbia		.0806	.0354	.0798
Occupation	5.68*(1,918)			
Blue-collar				-.0129
White-collar		.0759	.0264	.0630
Industry	.78 (3,915)			
Not stated				-.0079
Primary		-.0527	.0383	-.0606
Secondary		.0202	.0271	.0123
Tertiary		.0135	.0272	.0056
	R^2 = .04	$\bar{R}^2$ = .03	n = 931	

* Indicates significance at .05 level.

Table 9

REGRESSION RESULTS,
DEPENDENT VARIABLE = 1 IF LOCAL EMPLOYERS USED AS SEARCH METHOD,
ZERO OTHERWISE

Factor	Partial *F* (*d.f.*)	Estimated Coefficient	Standard Error	Adjusted Coefficient
Intercept		.5197	.0461	.6738
Job Type	1.27 (1,929)			
Former		-.0374	.0299	-.0320
New or not stated				.0054
Sex	14.99*(1,928)			
Male				.0387
Female		-.1422	.0251	-.1035
Age	9.87*(2,926)			
14-19				-.0439
20-44		.0942	.0303	.0503
45+		-.0312	.0366	-.0751
Education	8.10*(2,924)			
Elementary				-.0720
Secondary		.1021	.0243	.0301
University		.2117	.0465	.1397
Marital Status	1.90 (1,923)			
Married		-.0551	.0245	-.0253
Single & other				.0298
Region	4.65*(4,919)			
Atlantic				-.0764
Quebec		.0369	.0342	-.0395
Ontario		.0761	.0370	-.0003
Prairie		.2165	.0441	.1401
British Columbia		.1654	.0426	.0890
Occupation	.53 (1,918)			
Blue-collar				.0048
White-collar		-.0285	.0317	-.0237
Industry	1.06 (3,915)			
Not stated				-.0404
Primary		.0722	.0460	.0318
Secondary		.0727	.0326	.0323
Tertiary		.0224	.0327	-.0180
	R^2 = .08	$\bar{R}^2$ = .07	n = 931	

* Indicates significance at .05 level.

Comparing Tables 6 and 10, one may note that those groups of job seekers who use larger numbers of methods in general also utilize "local employers" disproportionately. This is partly due to an "accounting identity".

Table 10

RESULTS OF PAIRWISE COMPARISONS FOR EQUATION IN TABLE 9

Factor	Level 1	Level 2	*t*
Sex	Male	Female	-5.67*
Age	14-19	20-44	3.10*
	14-19	45+	- .85
	20-44	45+	-4.85*
Education	Elementary	Secondary	4.20*
	Elementary	University	4.55*
	Secondary	University	2.62*
Region	Atlantic	Quebec	1.08
	Atlantic	Ontario	2.06*
	Atlantic	Prairie	4.91*
	Atlantic	British Columbia	3.88*
	Quebec	Ontario	1.50
	Quebec	Prairie	5.34*
	Quebec	British Columbia	3.84*
	Ontario	Prairie	3.74*
	Ontario	British Columbia	2.50*
	Prairie	British Columbia	-1.18

*Indicates significance at .05 level.

The same regional and education level effect is shown in Tables 11 and 12 to hold for the search method "local newspapers" as was noted above for "local employers". However, females are significantly more likely than males, and white-collars workers significantly more likely than blue-collar workers, to use "local newspapers".

Table 11

REGRESSION RESULTS,
DEPENDENT VARIABLE = 1 IF LOCAL NEWSPAPERS USED AS SEARCH METHOD,
ZERO OTHERWISE

Factor	Partial *F* *(d.f.)*	Estimated Coefficient	Standard Error	Adjusted Coefficient
Intercept		.0497	.0430	.2948
Job Type	9.16*(1,929)			
Former		-.0371	.0279	-.0318
New or not stated				.0053
Sex	24.16*(1,928)			
Female		.0632	.0234	.0460
Male				-.0172
Age	.43 (2,925)			
14-19				-.0015
20-44		.0063	.0283	.0048
45+		-.0083	.0342	-.0098
Education	21.70*(2,923)			
Elementary				-.0909
Secondary		.1327	.0227	.0418
University		.2378	.0434	.1469
Marital Status	1.37 (1,922)			
Married		.0254	.0229	.0114
Single & other				-.0137
Region	13.27*(4,918)			
Atlantic				-.1033
Quebec		.0117	.0319	-.0916
Ontario		.1899	.0345	.0866
Prairie		.2523	.0411	.1490
British Columbia		.2123	.0397	.1090
Occupation	16.20*(1,917)			
White-collar		.1266	.0296	.1051
Blue-collar				-.0215
Industry	2.39 (3,914)			
Primary		-.0966	.0429	-.0986
Secondary		-.0195	.0304	-.0215
Tertiary		.0449	.0305	.0429
Not stated				-.0020
	R^2 = .15	$\bar{R}^2$ = .15	n = 931	

* Indicates significance at .05 level.

Table 12

RESULTS OF PAIRWISE COMPARISONS FOR EQUATION IN TABLE 11

Factor	Level 1	Level 2	*t*
Job Type	Former	New or not stated	1.33
Sex	Female	Male	-2.70*
Education	Elementary	Secondary	5.85*
	Elementary	University	5.48*
	Secondary	University	2.69*
Region	Atlantic	Quebec	.37
	Atlantic	Ontario	5.50*
	Atlantic	Prairie	6.14*
	Atlantic	British Columbia	5.37*
	Quebec	Ontario	7.30*
	Quebec	Prairie	7.26*
	Quebec	British Columbia	6.44*
	Ontario	Prairie	1.78
	Ontario	British Columbia	.94
	Prairie	British Columbia	-1.22
Occupation	White-collar	Blue-collar	-4.28*

*Indicates significance at .05 level.

Tables 13 and 14 indicate that the search method "friends and relatives" is more likely to be utilized by males than females, and more likely to be utilized in the Prairies and Quebec than in the Atlantic Region or Ontario. Education level is not a significant factor.

Viewing Tables 7 to 14 as a set, they provide some interesting descriptive information. The results are generally in line with expectations, with the possible exception of the regional variations, which are unexplained. I will refrain from any *ad hoc* theorizing on the reasons underlying the regional variations.

Table 13

REGRESSION RESULTS,
DEPENDENT VARIABLE = 1 IF FRIENDS AND RELATIVES USED AS SEARCH METHOD,
ZERO OTHERWISE

Factor	Partial *F* (*d.f.*)	Estimated Coefficient	Standard Error	Adjusted Coefficient
Intercept		.4626	.0492	.5781
Job Type	17.45*(1,929)			
Former		-.1810	.0319	-.1551
New or not stated				.0259
Sex	8.40*(1,928)			
Male				.0347
Female		-.1277	.0268	-.0930
Age	2.60 (2,926)			
14-19				.0635
20-44		-.0688	.0324	-.0053
45+		-.1052	.0391	-.0417
Education	2.61 (2,924)			
Elementary				-.0410
Secondary		.0578	.0260	.0168
University		.1214	.0496	.0804
Marital Status	0.0 (1,923)			
Married		.0155	.0262	.0071
Single & other				-.0084
Region	3.04*(4,919)			
Atlantic				-.1357
Quebec		.1596	.0365	.0239
Ontario		.1193	.0395	-.0164
Prairie		.2071	.0470	.0714
British Columbia		.1554	.0454	.0197
Occupation	.45 (1,918)			
Blue-collar				.0012
White-collar		-.0070	.0338	-.0058
Industry	1.10 (3,915)			
Not stated				-.0558
Primary		.0503	.0491	-.0055
Secondary		.0494	.0348	-.0064
Tertiary		.0912	.0349	.0354
	R^2 = .05	$\bar{R}^2$ = .05	n = 931	

* Indicates significance at .05 level.

Table 14

RESULTS OF PAIRWISE COMPARISONS FOR EQUATION IN TABLE 13

Factor	Level 1	Level 2	*t*
Job Type	Former	New or not stated	5.67*
Sex	Male	Female	-4.77*
Region	Atlantic	Quebec	4.37*
	Atlantic	Ontario	3.02*
	Atlantic	Prairie	4.40*
	Atlantic	British Columbia	3.42*
	Quebec	Ontario	-1.44
	Quebec	Prairie	1.26
	Quebec	British Columbia	- .11
	Ontario	Prairie	2.41*
	Ontario	British Columbia	1.04
	Prairie	British Columbia	-1.12

*Indicates significance at .05 level.

This concludes the presentation of the formal empirical model on worker search, but there are several ancillary questions that can be analysed using data from the same survey. The first question explored is: How do the characteristics of successful users of various search methods compare with the characteristics of unsuccessful users? The results of this analysis are presented in Tables 15 through 22. For each of the five search methods previously analysed in equations 4.3 through 4.7, the subsample of microdata was sorted to provide information only on those using a given search method. The number of observations in the regressions reported in Tables 15 through 22 thus varies between 165 for private agency users and 708 for CMC users. For each of the five methods considered, the dependent variable is a dummy, set equal to unity if the individual found a job by using *that method* and zero otherwise. These were then regressed on the same set of characteristics variables used in equations 4.1 through 4.7.

Table 15

REGRESSION RESULTS,
DEPENDENT VARIABLE = 1 IF JOB FOUND USING CMC,
ZERO IF UNSUCCESSFUL

(Nonusers excluded from sample)

Factor	Partial *F* *(d.f.)*	Estimated Coefficient	Standard Error	Variable Mean	Adjusted Coefficient
Intercept (CMC source)		.0935	.0351	.0964	.0964
Job Type	.12 (1,706)				
Former		-.0020	.0229	.1285	-.0017
New or not stated				.8715	.0003
Sex	15.16*(1,705)				
Male				.7307	-.0250
Female		.0929	.0184	.2693	.0679
Age	3.19*(2,703)				
14-19				.1967	.0483
20-44		-.0354	.0224	.5661	.0129
45+		-.1192	.0273	.2372	-.0709
Education	.60 (2,701)				
Elementary				.3578	.0135
Secondary		-.0219	.0180	.5710	-.0084
University		-.0135	.0342	.0712	0
Marital Status	1.57 (1,700)				
Married		.0360	.0177	.5502	.0162
Single & other				.4498	-.0198
Region	2.47*(4,696)				
Atlantic				.1013	.0266
Quebec		-.0490	.0262	.4190	-.0224
Ontario		.0182	.0279	.2582	.0448
Prairie		-.0084	.0333	.1028	.0182
British Columbia		-.0835	.0321	.1187	-.0569
Occupation	1.87 (1,695)				
Blue-collar				.8252	-.0045
White-collar		.0259	.0236	.1748	.0214
Industry	1.26 (3,692)				
Not stated				.1855	-.0423
Primary		.0219	.0328	.0887	-.0204
Secondary		.0637	.0237	.3557	.0214
Tertiary		.0478	.0244	.3701	.0055
	R^2 = .06		$\bar{R}^2$ = .05		n = 708

* Indicates significance at .05 level.

Table 16

RESULTS OF PAIRWISE COMPARISONS FOR EQUATION IN TABLE 15

Factor	Level 1	Level 2	t
Sex	Male	Female	5.04*
Age	14-19	20-44	-1.58
	14-19	45+	-4.36*
	20-44	45+	-4.35*
Region	Atlantic	Quebec	-1.87
	Atlantic	Ontario	.65
	Atlantic	Prairie	- .25
	Atlantic	British Columbia	-2.60*
	Quebec	Ontario	3.49*
	Quebec	Prairie	1.53
	Quebec	British Columbia	-1.43
	Ontario	Prairie	- .97
	Ontario	British Columbia	-3.87*
	Prairie	British Columbia	-2.35*

*Indicates significance at .05 level.

Looking first at Tables 15 and 16, it is noted that female CMC users were more likely to find a job through the CMC than male users, and persons in the 45+ category were less likely to find a job through the CMC than those in either of the two younger age groups. These differences are quite marked. Only 7 per cent of the males using CMC's found jobs using that method, while 16 per cent of the females did so. Of course only 27 per cent of all CMC users were female.[1]

Regionally, the probability of finding a job through the CMC is highest in Ontario, lowest in British Columbia, and above average in the Atlantic Region. Note that this is not explained by the overall pattern of success in job search by region as shown in Tables 1 and 3.

Table 17 indicates that none of the factors considered were statistically significant in detecting differences between successful and unsuccessful users of private agencies. Tables 18 and 19 show the importance of including the job-type variable in the previous regressions to reduce extraneous variation.

[1]These observations are based on information in Table 15; i.e., the nine-percentage-point "spread" between males and females is after adjustment for the other characteristics considered.

Table 17

REGRESSION RESULTS,
DEPENDENT VARIABLE = 1 IF JOB FOUND USING PRIVATE AGENCIES,
ZERO IF UNSUCCESSFUL

(Nonusers excluded from sample)

Factor	Partial F ($d.f.$)	Estimated Coefficient	Standard Error	Variable Mean	Adjusted Coefficient
Intercept (Private agency source)		.1670	.0727	.0942	.0942
Job Type	.78 (1,163)				
Former		-.0271	.0512	.1016	-.0243
New or not stated				.8984	.0028
Sex	3.11 (1,162)				
Male				.7161	-.0054
Female		.0189	.0384	.2839	.0135
Age	1.29 (2,160)				
14-19				.1642	-.0148
20-44		.0413	.0505	.6161	.0265
45+		-.0482	.0567	.2197	-.0630
Education	1.97 (2,158)				
Elementary				.3391	-.0019
Secondary		-.0149	.0370	.5279	-.0168
University		.0736	.0559	.1330	.0717
Marital Status	.02 (1,157)				
Married		-.0182	.0349	.5889	-.0075
Single & other				.4111	.0107
Region	2.11 (4,153)				
Atlantic				.1058	-.0101
Quebec		-.0766	.0530	.3274	-.0867
Ontario		.0319	.0553	.2648	.0218
Prairie		.0224	.0648	.1207	.0123
British Columbia		.1330	.0586	.1813	.1229
Occupation	.38 (1,152)				
Blue-collar				.7423	.0038
White-collar		-.0148	.0412	.2577	-.0110
Industry	1.62 (3,149)				
Not stated				.1693	.0878
Primary		-.1336	.0854	.0450	-.0458
Secondary		-.1498	.0497	.3637	-.0620
Tertiary		-.0648	.0489	.4220	.0230
	R^2 = .14		$\bar{R}^2$ = .10		n = 165

Table 18

REGRESSION RESULTS,
DEPENDENT VARIABLE = 1 IF JOB FOUND USING LOCAL EMPLOYERS,
ZERO IF UNSUCCESSFUL

(Nonusers excluded from sample)

Factor	Partial F $(d.f.)$	Estimated Coefficient	Standard Error	Variable Mean	Adjusted Coefficient
Intercept		.0628	.0549	.2916	.2916
Job Type	75.88*(1,625)				
Former		.4331	.0351	.1342	.3750
New or not stated				.8658	-.0581
Sex	.36 (1,624)				
Male				.7656	.0051
Female		-.0217	.0300	.2344	-.0166
Age	1.85 (2,622)				
14-19				.2023	-.0308
20-44		.0462	.0346	.5913	.0152
45+		.0168	.0432	.2064	-.0140
Education	1.41 (2,620)				
Elementary				.3313	-.0198
Secondary		.0158	.0279	.5807	-.0040
University		.1206	.0502	.0880	.1008
Marital Status	0.0 (1,619)				
Married		.0232	.0273	.5125	.0113
Single & other				.4875	-.0119
Region	.76 (4,615)				
Atlantic				.1002	.0333
Quebec		-.0428	.0412	.3986	-.0095
Ontario		-.0919	.0438	.2415	-.0576
Prairie		.0298	.0497	.1227	.0631
British Columbia		.0166	.0485	.1370	.0499
Occupation	3.90*(1,614)				
Blue-collar				.8298	-.0018
White-collar		.0105	.0362	.1702	.0087
Industry	5.22*(3,611)				
Not stated				.1768	-.1249
Primary		.1472	.0523	.0834	.0223
Secondary		.0972	.0380	.3804	-.0277
Tertiary		.2104	.0384	.3594	.0855
	R^2 = .15		$\bar{R}^2$ = .14		n = 627

* Indicates significance at .05 level.

Table 19

RESULTS OF PAIRWISE COMPARISONS FOR EQUATION IN TABLE 18

Factor	Level 1	Level 2	*t*
Job Type	Former	New or not stated	-12.32*
Occupation	Blue-collar	White-collar	.29
Industry	Not stated	Primary	2.81*
	Not stated	Secondary	2.56*
	Not stated	Tertiary	5.48*
	Primary	Secondary	-1.12
	Primary	Tertiary	1.35
	Secondary	Tertiary	3.91*

*Indicates significance at .05 level.

Overall, about 29 per cent of the users of "local employers" as a search method found a job using that method,[1] but almost 67 per cent of those job seekers who used the method "local employers" *and* returned to a former job "found" their (former) job by that method.

The factors in Tables 20 through 22 are either not statistically significant, or they are uninteresting. The tables are included because some of the coefficients and variable means for the nonsignificant factors may be of interest.

[1]This may be a convenient place to make a point about the comparability of the figures in this Study and those in the Economic Council of Canada's *Eighth Annual Review*, Chapter 8. For example, Table 8-4 on page 179 reports that 27 per cent of those using "local employers" were successful in using that method, while Table 18 herein gives a figure of 29 per cent. The difference is due to subsampling error, in that the tables in the *Eighth Annual Review* are based on tabulations from the full sample; those in this Study are based on a one-in-four subsample. Similar differences can be noted with respect to other tables.

Table 20

REGRESSION RESULTS,
DEPENDENT VARIABLE = 1 IF JOB FOUND USING LOCAL NEWSPAPERS,
ZERO IF UNSUCCESSFUL

(Nonusers excluded from sample)

Factor	Partial F ($d.f.$)	Estimated Coefficient	Standard Error	Variable Mean	Adjusted Coefficient
Intercept		-.1363	.0932	.1618	.1618
Job Type	5.27*(1,272)				
Former		-.1674	.0534	.0896	-.1524
New or not stated				.9104	.0150
Sex	.40 (1,271)				
Male				.6123	-.0302
Female		.0778	.0357	.3877	.0476
Age	.05 (2,269)				
14-19				.2235	.0608
20-44		-.0849	.0446	.5573	-.0241
45+		-.0615	.0529	.2192	-.0007
Education	.49 (2,267)				
Elementary				.2018	-.0327
Secondary		.0199	.0418	.6695	-.0128
University		.1505	.0613	.1287	.1178
Marital Status	.85 (1,266)				
Married		.0414	.0359	.5340	.0193
Single & other				.4660	-.0221
Region	.29 (4,262)				
Atlantic				.0523	-.1039
Quebec		.1172	.0711	.2722	.0133
Ontario		.1183	.0695	.3341	.0144
Prairie		.0627	.0735	.1676	-.0412
British Columbia		.1263	.0748	.1738	.0224
Occupation	.93 (1,261)				
Blue-collar				.7082	.0205
White-collar		-.0703	.0396	.2918	-.0498
Industry	6.07*(3,258)				
Not stated				.2100	-.2056
Primary		.2869	.1054	.0244	.0813
Secondary		.1991	.0530	.2845	-.0065
Tertiary		.2952	.0478	.4811	.0896
	R^2 = .10		$\bar{R}^2$ = .07	n = 274	

* Indicates significance at .05 level.

A second line of ancillary analysis deals with the time elapsed between leaving one job and initiating search for another. The questionnaire (see Appendix A) coded this time period into three intervals: began search immediately, waited 2 to 14 days, waited two weeks or more. This information is of interest because it is pertinent to the question of how much the average duration of frictional unemployment can be reduced by providing more job market information. If large numbers of persons wait a considerable period before even beginning search, depending upon the reasons for this procrastination, this may imply a certain "irreducible minimum" duration for frictional unemployment, at least "irreducible" by providing better information flow.

Table 21

RESULTS OF PAIRWISE COMPARISONS FOR EQUATION IN TABLE 20

Factor	Level 1	Level 2	*t*
Job Type	Former	New or not stated	3.13*
Industry	Not stated	Primary	2.72*
	Not stated	Secondary	3.75*
	Not stated	Tertiary	6.18*
	Primary	Secondary	- .86
	Primary	Tertiary	.08
	Secondary	Tertiary	2.51*

*Indicates significance at .05 level.

Table 22

REGRESSION RESULTS,
DEPENDENT VARIABLE = 1 IF JOB FOUND USING FRIENDS AND RELATIVES,
ZERO IF UNSUCCESSFUL

(Nonusers excluded from sample)

Factor	Partial F *(d.f.)*	Estimated Coefficient	Standard Error	Variable Mean	Adjusted Coefficient
Intercept		.2193	.0575	.1992	.1992
Job Type	.25 (1,536)				
Former		-.0350	.0394	.1025	-.0314
New or not stated				.8975	.0036
Sex	.01 (1,535)				
Male				.7580	-.0054
Female		.0224	.0299	.2420	.0170
Age	2.69 (2,533)				
14-19				.2287	.0223
20-44		-.0112	.0350	.5472	.0111
45+		-.0721	.0418	.2241	-.0498
Education	.70 (2,531)				
Elementary				.3340	.0174
Secondary		-.0206	.0282	.5821	-.0032
University		-.0645	.0512	.0839	-.0471
Marital Status	2.98 (1,530)				
Married		-.0691	.0287	.5177	-.0333
Single & other				.4823	.0358
Region	1.25 (4,526)				
Atlantic				.0851	-.0178
Quebec		.0445	.0442	.4339	.0267
Ontario		-.0115	.0473	.2382	-.0293
Prairie		-.0638	.0532	.1171	-.0816
British Columbia		.0696	.0527	.1257	.0518
Occupation	1.00 (1,525)				
Blue-collar				.8202	.0146
White-collar		-.0812	.0358	.1798	-.0666
Industry	.86 (3,522)				
Not stated				.1766	-.0503
Primary		.0045	.0544	.0764	-.0458
Secondary		.0526	.0387	.3536	.0023
Tertiary		.0798	.0383	.3934	.0295
	R^2 = .03		$\bar{R}^2$ = .02	n = 538	

Table 23

REGRESSION RESULTS,
DEPENDENT VARIABLE = 1 IF SEARCH BEGAN IMMEDIATELY,
ZERO OTHERWISE

Factor	Partial *F* (*d.f.*)	Estimated Coefficient	Standard Error	Adjusted Coefficient
Intercept		.2512	.4872	.4445
Job Type	2.42 (1,929)			
Former				.0016
New or not stated		-.0112	.0316	-.0096
Sex	30.46*(1,928)			
Male				.0319
Female		-.1174	.0265	-.0855
Age	10.24*(2,926)			
14-19				-.1019
20-44		.1117	.0321	.0098
45+		.1659	.0387	.0640
Education	3.65*(2,924)			
Elementary				.0305
Secondary		-.0434	.0257	-.0129
University		-.0875	.0492	-.0570
Marital Status	.20 (1,923)			
Married				.0049
Single & other		-.0091	.0259	-.0042
Region	.76 (4,919)			
Atlantic				-.0218
Quebec		.0325	.0362	.0107
Ontario		.0274	.0391	.0056
Prairie		-.0422	.0466	-.0640
British Columbia		.0512	.0450	.0294
Occupation	.29 (1,918)			
Blue-collar		-.0806	.0335	-.0669
White-collar				.0137
Industry	5.69*(3,915)			
Primary		.1712	.0487	.0192
Secondary		.2051	.0345	.0531
Tertiary		.1727	.0346	.0207
Not stated				-.1520
	R^2 = .08	$\bar{R}^2$ = .08	n = 931	

* Indicates significance at .05 level.

Table 24

RESULTS OF PAIRWISE COMPARISONS FOR EQUATION IN TABLE 23

Factor	Level 1	Level 2	t
Education	Elementary	Secondary	-1.69
	Elementary	University	-1.78
	Secondary	University	-1.03
Sex	Male	Female	-4.43*
Age	14-19	20-44	3.48*
	14-19	45+	4.28*
	20-44	45+	1.99*
Industry	Primary	Secondary	.80
	Primary	Tertiary	.03
	Primary	Not stated	-3.52*
	Secondary	Tertiary	-1.19
	Secondary	Not stated	-5.95*
	Tertiary	Not stated	-4.99*

*Indicates significance at .05 level.

Tables 23 and 24 indicate that males are more likely than females to begin search immediately, and that the propensity to search immediately increases with age. There is some evidence that the propensity to begin search immediately also declines with education level, but the t comparisons are not statistically significant. Table 25 presents information on the opposite end of the time-elapsed categorization. Only two factors are significant among the characteristics of persons who waited two weeks or more to begin search. By symmetry with Table 23, females are more likely than males to wait two weeks or more (t = 3.70), and white-collar workers are more likely to do so than blue-collar workers (t = 4.84).[1] These results are generally compatible with the hypothesis that those persons who can least afford the luxury of an "unpaid vacation" are most likely to begin search early, but I have no rationalization for the behaviour of the age variable in Table 23.

[1]The t values are calculable directly from Table 25.

Table 25

REGRESSION RESULTS,
DEPENDENT VARIABLE = 1 IF TIME ELAPSED BEFORE SEARCH IS TWO WEEKS OR MORE,
ZERO OTHERWISE

Factor	Partial F *(d.f.)*	Estimated Coefficient	Standard Error	Adjusted Coefficient
Intercept		.1026	.0349	.1423
Job Type	3.64 (1,929)			
Former		-.0414	.0226	-.0355
New or not stated				.0059
Sex	15.84*(1,928)			
Male				-.0191
Female		.0703	.0190	.0512
Age	1.75 (2,926)			
14-19				-.0297
20-44		.0412	.0230	.0115
45+		.0289	.0277	-.0008
Education	.96 (2,924)			
Elementary				-.0032
Secondary		.0036	.0184	.0004
University		.0160	.0352	.0128
Marital Status	1.06 (1,923)			
Married		.0260	.0185	.0119
Single & other				-.0141
Region	2.03 (4,919)			
Atlantic				.0110
Quebec		-.0253	.0259	-.0143
Ontario		.0175	.0280	.0285
Prairie		.0396	.0334	.0506
British Columbia		-.0745	.0322	-.0635
Occupation	11.46*(1,918)			
Blue-collar				-.0197
White-collar		.1161	.0240	.0964
Industry	.77 (3,915)			
Not stated				.0292
Primary		-.0772	.0348	-.0480
Secondary		-.0306	.0247	-.0014
Tertiary		-.0320	.0248	-.0028
	R^2 = .05	$\bar{R}^2$ = .04	n = 931	

* Indicates significance at .05 level.

About 44 per cent of the sample began search immediately (47 per cent of the males and 36 per cent of the females), while 14 per cent waited two weeks or more (12 per cent of the males and 19 per cent of the females). Assuming that this procrastination is based upon a desire for an "unpaid vacation", this gives some idea of the minimum amount of frictional unemployment that is "voluntary". Of course, some of those who waited two weeks or more before search may have done so due to the belief that no openings were available, a belief that could be changed (or possibly strengthened) by better job market information.

Detailed analysis of tabulations produced from the microdata disclosed no statistically significant effect of difference in time elapsed before beginning search on the probability of finding a job. There did appear to be a consistent tendency for those who waited two weeks or more before beginning search to have below-average success in finding a job, but this was not statistically significant.[1] The hypothesis was not tested with the microdata for a number of reasons having to do with computer programming, access to the data base, and lack of foresight on the part of the author.

One final interesting aspect of search behaviour disclosed by the survey will be discussed. A surprising finding was that the search behaviour of those who did not have a job prior to beginning their longest continuous spell of unemployment did not differ markedly from that of the average for the sample. Persons in this category include those entering the labour force for the first time and those who might have been in the labour force at some time in the past but had dropped out for some period -- e.g., married women. Of those listed as having no previous job, 58 per cent were males; 60 per cent were 14-19 years of age; and another 20 per cent were 20-24 years of age. Thus about 80 per cent of the no-previous-job category may be termed "new entrants" (college students may, of course, have had

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[1]Table 8-3, in Economic Council of Canada, *Eighth Annual Review*, p. 178, indicates that 55 per cent of those who began search immediately found a job, versus 51 per cent for those who waited 2 to 14 days and 52 per cent for those who waited more than two weeks.

previous labour market experience). Of the remaining 20 per cent of the no-previous-job category, about half were females, almost 90 per cent of whom were married. Table 26 illustrates one aspect of search behaviour for the no-previous-job group. Overall, those with no previous job used an average of 3.23 search methods, virtually identical to the mean for the total sample of 3.25. The data in Table 26 indicate that the no-previous-job group are less likely than the average worker to use trade unions, and a bit more likely to use friends and relatives or to write letters of application.

Table 26

WORKERS USING SPECIFIED JOB SEARCH METHODS, AND AVERAGE SUCCESS RATIO BY SPECIFIC SEARCH METHOD*

Search Method	Percentage Using		Success Ratio	
	Total Sample	No Previous Job	Total Sample	No Previous Job
Contact Canada Manpower Centre	76	75	11	9
Contact private employment agencies	20	21	7	7
Check with employers in area	67	67	27	12
Check with employers outside area	29	23	8	7
Place, or answer, advertisements in local papers	29	32	15	6
Place, or answer, advertisements in papers outside locality	9	7	3	--
Write letter of application	26	30	6	4
Check with friends or relatives	57	61	24	19
Check with trade unions	12	6	17	5

* Columns 1 and 3 are reproduced from Economic Council of Canada, *Eighth Annual Review*, Table 8-2, p. 177, and Table 8-4, p. 179, respectively. The column for new entrants is also calculated from the total sample; i.e., differences between columns are not due to subsampling error.

While, overall, about 52 per cent of the persons in the sample had obtained employment by the survey date,[1] only 33 per cent of the no-previous-job group had done so. The success ratios for specific job search methods indicate that persons in this group are about as successful as other workers in using intermediaries, but fare worse using all other methods. The difference in success ratios between "no-previous-job" and the total sample is greatest for "local employers". It is possible that employers use the rule "experienced only" as a convenient screening device in dealing with unsolicited applicants.

[1] *Ibid.* The mean for the subsample was 53.7 per cent (see Table 1).

It should be noted that the success ratio definition employed herein may yield a false impression of the degree of success in job-finding. Although only 52 per cent of the sample had found jobs through search by the survey date, this does not mean that 48 per cent were still unemployed. About 9 per cent of the sample had either found a job without search (primarily through recall to a former job), become self-employed, returned to school, or otherwise dropped out of the labour force. The effect of this consideration is probably to reduce the difference in reported success rates between "no-previous-job" and others. New entrants are probably more likely than average to return to school; and older persons in the no-previous-job group, particularly married females, are probably more likely to drop out of the labour force if some period of search fails to locate a suitable job than would persons in the sample who were employed prior to search.

Comparison of the results presented in this section of the Study with those of studies performed in the United States is deferred to the concluding chapter, since these comparisons are most fruitfully discussed within the general framework of implications for further research.

CHAPTER 5

EMPIRICAL EVIDENCE ON EMPLOYER SEARCH BEHAVIOUR

The basic data source utilized in this chapter is the Canadian Job Vacancy Survey. The data pertain to two periods in early 1970 and are more fully described in Appendix C. Three tabulations were available. The first, covering the period January through March, showed activity counts, total vacancies, and total full-time vacancies by occupation (nine categories), by region (the five major economic regions of Canada), by search method (fourteen categories). The second showed activity counts by industry (three-digit SIC), by occupation, by search method; the third showed activity counts by industry, by region, by search method. What I have termed the second and third tabulations covered the period May through July 1970. The categories were aggregated in various ways prior to analysis to reduce the number of empty cells, and cells with very small sample counts.

Table 27 presents information on three selected search methods for the January-March period. The three methods selected for analysis are the three quantitatively most important methods used by employers.[1] The sample counts within cells for other methods are too small to allow meaningful analysis. Although some other methods were almost as heavily utilized as private agencies, this method is included on the basis of "interest". Persons concerned with improving the effectiveness of the public employment service are generally also concerned with the proper role of private agencies in the job market.[2] Much of the literature is very hostile towards private agencies,[3] and while the presentation herein makes no judgment

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[1] See Economic Council of Canada, *Eighth Annual Review*, Table 8-7, p. 182.

[2] See, for example, Leonard P. Adams, *The Public Employment Service in Transition, 1933-1968*, New York State School of Labor and Industrial Relations, Cornell University, Ithaca, New York, 1969, pp. 189-90.

[3] See Rees, *op. cit.*, p. 563.

regarding the role of private agencies, it was felt that information regarding employer usage of this search method would be useful in policy discussions.[1]

Table 27

DUMMY VARIABLE REGRESSION RESULTS,
DEPENDENT VARIABLE = PERCENTAGE OF OCCUPATION AND REGION SPECIFIC ACTIVITY COUNT LISTED WITH SPECIFIED TECHNIQUE

Factor \ Dependent Variable	Partial *F* (*d.f.*)	CMC	Partial *F* (*d.f.*)	Adver-tising	Partial *F* (*d.f.*)	Private Agencies
Overall Mean		30.915		38.875		3.013
Occupation Effect	2.61* (7,32)		1.26 (7,32)		5.58* (7,32)	
Professional, technical, and managerial		-18.415		6.105		4.227
Clerical and sales		- 7.495		- 0.355		8.047
Service		- 7.495		13.345		-3.013
Processing		9.745		0.825		-3.013
Machine trades		- 1.115		1.105		-0.393
Bench work		18.905		- 1.235		-2.373
Structural		- 1.555		- 2.935		-0.473
Other		7.425		-16.855		-3.013
(Standard error)		(10.284)		(10.053)		(2.119)
Region Effect	0.97 (4,28)		2.22 (4,28)		3.57* (4,28)	
Atlantic		6.173		0.225		-2.750
Quebec		0.760		-10.663		3.050
Ontario		2.423		1.413		1.350
Prairie		- 9.190		12.388		-0.812
British Columbia		- 0.165		- 3.363		-0.837
(Standard error)		(8.131)		(7.948)		(1.675)
R^2		.44		.40		.70
$\bar{R}^2$		.22		.17		.58
n		40		40		40

* Indicates significance at .05 level.

[1] A major research project on private employment agencies in Canada has been undertaken by Lawrence Fric, in the form of his doctoral dissertation, currently being completed in the Department of Economics at the University of Toronto.

The method of analysis utilized is dummy variable regression, as described in Appendix B, noting that the data utilized are tabular, not micro-observations. We are therefore dealing with a single replication, and the error term for testing consists entirely of interaction effects. Since it turns out, with a problem of this type, that the standard error of the difference between any pair of coefficients for different levels within a factor is the same, only one standard error term per factor per equation is reported. The detailed table of *t* comparisons is not reported herein, but these tests may be very easily accomplished, using information presented in Table 27, according to the procedure outlined in Appendix B.

Generalizing somewhat, Table 27 discloses that the percentage of activity counts listed with CMC's varies significantly among occupations, with the extreme variations being a tendency to list bench work openings with this method, and not to list professional, technical and managerial openings. The region effect is not significant in the CMC equation. Neither occupation nor region is significant in the advertising equation on the basis of the partial *F* test, but both factors are significant in the private agencies equation.[1] With regard to to private agencies, the table indicates that employers are more likely to list openings in the first two occupation categories than in other occupations with this search method, and that these agencies are more heavily utilized in Quebec and Ontario than elsewhere.

Tables 28 and 29 present similar information for the same three selected search methods tabulated for industry and region, and for industry and occupation, respectively.[2]

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[1]None of the patterns of significance shown in Table 27 are affected if the region factor is introduced into the regression first.

[2]For Tables 27, 28 and 29, note that the "overall mean" listed in the tables is the mean of percentages within cells and is thus not equal to the percentage of total activity count listed with the method specified. These latter percentages are reported in Economic Council of Canada, *Eighth Annual Review*, Table 8-7, p. 182.

Table 28

DUMMY VARIABLE REGRESSION RESULTS,
DEPENDENT VARIABLE = PERCENTAGE OF INDUSTRY AND REGION
SPECIFIC ACTIVITY COUNT LISTED WITH SPECIFIED TECHNIQUE

SIC Code	Factor / Dependent Variable	Partial *F* (*d.f.*)	CMC	Partial *F* (*d.f.*)	Advertising	Partial *F* (*d.f.*)	Private Agencies
	Overall Mean		20.437		44.957		5.503
	Industry Effect	2.51* (11,48)		2.14* (11,48)		2.09* (11,48)	
5-9	Mining		13.763		-13.357		13.837
10-39	Manufacturing		8.503		- 2.417		2.277
40-42	Construction		- 2.157		- 7.657		- 2.923
50-57	Transport, communication		- 1.957		- 9.657		- 1.163
60-62	Wholesale trade		4.003		4.743		2.057
63-69	Retail trade		6.443		- 2.577		- 3.823
70-73	Finance, insurance and real estate		-11.337		16.083		- 1.483
80	Education		- 6.557		12.603		- 5.503
82-83	Health and welfare		-11.337		14.543		- 4.083
85-89	Services		7.943		- .837		- 3.803
90-95	Public administration and defence		- 9.977		7.543		- 4.963
999	Unspecified		2.663		-19.017		9.577
	(Standard error)		(7.818)		(11.043)		(5.324)
	Region Effect	0.33 (4,44)		0.79 (4,44)		3.90* (4,44)	
	Atlantic		1.188		2.068		- 5.220
	Quebec		- 2.270		- 6.040		4.688
	Ontario		- .270		- 1.824		5.405
	Prairie		- 1.495		6.018		- 3.387
	British Columbia		2.846		- .224		- 1.487
	(Standard error)		(5.046)		(7.129)		(3.436)
	R^2		.38		.37		.50
	$\bar{R}^2$		.17		.16		.33
	n		60		60		60

* Indicates significance at .05 level.

Table 28 indicates that the industry effect is significant in all three equations. This is unchanged if the region factor is introduced into the equation first. Region is significant only in the private agencies equation, where it is indicated that private agencies are more important in Quebec and Ontario than elsewhere in Canada. The pattern in the industry coefficients indicates that advertising is utilized heavily by finance, education, and health and welfare services. The manufacturing industry tends to utilize intermediaries, both public and private, more than most industries. Services, and retail and wholesale trade, tend to use CMC's more than "average".[1] Note that the

[1] I did not note the coefficients for the mining industry because, although they are large in absolute value, they are based on very small sample counts.

construction industry has negative coefficients in all three equations. This is due to the fact that they use other search methods -- e.g., trade union hiring halls -- which are not shown in the table.

Table 29

DUMMY VARIABLE REGRESSION RESULTS,
DEPENDENT VARIABLE = PERCENTAGE OF INDUSTRY AND OCCUPATION SPECIFIC ACTIVITY COUNT LISTED WITH SPECIFIED TECHNIQUE

SIC Code	Factor \ Dependent Variable	Partial *F* (*d.f.*)	CMC	Partial *F* (*d.f.*)	Advertising	Partial *F* (*d.f.*)	Private Agencies
	Overall Mean		21.716		42.304		4.114
	Industry Effect	1.65 (9,40)		1.09 (9,40)		2.96* (9,40)	
10-39	Manufacturing		8.664		- 9.184		3.886
40-42	Construction		6.484		- 8.764		2.426
50-57	Transport, communication		.124		-16.404		- 0.034
60-62	Wholesale trade		- 3.896		8.916		- 1.174
63-69	Retail trade		6.184		- 1.084		- 2.754
80	Education		- .896		9.456		- 4.114
82-83	Health and welfare		-11.836		9.896		- 3.314
85-89	Services		10.064		4.656		- 2.434
90-95	Public administration and defence		-14.936		- 1.884		- 3.754
	All other (including unspecified)		.044		4.936		11.266
	(Standard error)		(8.388)		(10.809)		(3.488)
	Occupation Effect	3.18* (4,36)		3.94* (4,36)		3.62* (4,36)	
	Professional, technical, and managerial		-12.086		17.216		3.556
	Clerical and sales		- 1.816		.066		3.556
	Service		6.374		- 6.404		- 1.254
	Machine trades, bench work and structural		5.364		.186		- 2.784
	All other		2.164		-11.064		- 3.074
	(Standard error)		(5.932)		(7.643)		(2.467)
	R^2		.46		.44		.57
	$\bar{R}^2$		.27		.24		.42
	n		50		50		50

* Indicates significance at .05 level.

Table 29 indicates that the percentage of activity counts listed with CMC's does not vary significantly by industry, but that professional, technical, and managerial activity counts are listed in disproportionately small numbers with this method. The advertising equation also discloses a nonsignificant industry effect and significant occupation effect but, here, activity counts for professional, technical, and managerial openings are

listed in disproportionately large numbers. Both effects are significant in the private agencies equation, where we find an above-average tendency to use this method on the part of the manufacturing industry, and the previously noted tendency for white-collar openings to be listed with private agencies. It appears, looking at Tables 28 and 29 together, that the significance for the industry factor found in Table 28 is at least partially due to the different occupation mix of the activity count in different industries. Although the signs of the coefficients for the different industries are similar in both tables, Table 29 discloses that the industry factor is no longer significant when an industry-by-occupation cross-classification of the data is utilized. Thus, pending further study, I would not place much importance upon the industry differences found, unless they are adjusted for differences in the occupation mix of the activity count within the industry.

Tables 27 through 29 form a "set" despite the fact that they are based on two different samples. A superior approach to analysis would have been to obtain a four-way tabulation of the source data (methods by industry, by occupation, by region) and then to simultaneously estimate the three main effects and all two-factor interactions, leaving the three-factor interaction to form the error term. This was not possible with the samples in hand, because the sample count was so small that extreme aggregation of levels within factors would have been necessary to obtain "reasonable" counts in the majority of cells.[1] If one could obtain a tabulation of activity counts by these categories, covering some longer period -- say, a year -- the analysis described could be performed.

The three preceding tables have been primarily descriptive. In an attempt to perform some more analytical hypothesis testing, the May-July sample was aggregated to some 40 industry categories. The industry is chosen as the unit of analysis not so much because it is the most appropriate unit, but because it is the only variable

[1]Particularly for the private agencies equation in Tables 27 through 29, many of the cells are empty and others contain "small" sample counts, even given the degree of aggregation of levels within a factor and the fact that only two factors are considered at a time.

on which substantial amounts of information are available from other surveys. The Employment and Payrolls Survey[1] is the source of "exogenous" information utilized.

Four "dependent" variables were utilized -- namely, the number of activity counts within an industry category that were listed with CMC's, advertising, private agencies, and all "other" methods. These dependent variables are denoted as *CMC*, *ADV*, *PA*, and *OTH*, respectively, in what follows. The independent variables utilized are:

-- *EI*, the employment index for the industry in May 1970 (1961 = 100).

-- *AWW*, average weekly wages and salaries in the industry as of May 1970 (in dollars).

-- *A/E*, the activity count divided by employment in the industry. The units in which this variable are expressed are a bit difficult to express simply. The sample activity count (no "blow-up" factors) used was the mean over six occasions of the Survey. This was divided by employment expressed in hundreds of thousands of workers, yielding coded values of *A/E* which are all in the range of zero to fifty.[2]

-- *E/U*, employment divided by number of survey units in the industry. The denominator was obtained from the Dominion Bureau of Statistics by special request, asking them to count the number of sampling units in the Employment and Payrolls Survey frame, by industry category.

-- ΔEI, the percentage change in the employment index for the industry from May 1969 to May 1970.

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[1]The data are found in Dominion Bureau of Statistics, *Employment and Average Weekly Wages and Salaries* (Ottawa, various issues).

[2]See Appendix C for a description of the activity count measure.

-- *PTM*, the percentage of the activity count within the industry which represented openings for persons in professional, technical, and managerial occupations.

-- *CS*, the percentage of the activity count within the industry that represented openings for persons in clerical and sales occupations.

The *a priori* hypotheses regarding these variables were as follows. For employers who possessed screening capacity within their organizations, it would be expected that advertising would be a low-cost method of recruitment, at least within the set of three specific methods considered. Further, those employers who had experienced substantial employment growth over the longer-term period 1961 to 1970 would be expected to have screening capacity, *ceteris paribus*. Thus one expects a positive correlation between *EI* and *ADV*, and probably negative correlations between *EI* and *CMC*, and *EI* and *PA*. No hypotheses were formulated for the category *OTH*, since there is no necessary homogeneity with regard to any characteristic of interest among the methods included in this category. The category is established only for convenience in a subsequent step of the analysis.

The screening-capacity argument applies, strictly speaking, to those employers who have, over the longer-term period, hired "large" numbers of persons, which condition could be due to either growth or high turnover. The *EI* variable picks up only the first of these two causes. Unfortunately, since the Hirings and Separations Survey[1] was discontinued in 1966, no data were available on turnover.

The ΔEI variable is expected to test another facet of the screening-capacity argument, but it is really interpretable only when used in conjunction with *EI*. That is, if *EI* is "large" and ΔEI is "large" (or if both are "small"), the two variables probably measure the same thing. However, if (say) *EI* is "small" and ΔEI is "large", then we have an industry that may not have screening capacity but was faced, in the recent past, with hiring "large" numbers of workers. These industries may be expected to use intermediaries to a greater extent than other industries.

[1]Dominion Bureau of Statistics, *Hiring and Separation Rates in Certain Industries*, DBS Catalogue No. 72-006.

The last variable in this set, *A/E*, represents an attempt to test where industries that have (relatively) "large" numbers of openings at the present will list these. The interpretation of this variable is also conditioned upon *EI* and, to a lesser extent, *ΔEI*.

The *E/U* variable is introduced in an attempt to see how choice of search method varies by size of employer. This is again a proxy for testing the screening-capacity argument, as one would expect small employers to be less likely to have personnel departments capable of "scientific" screening processes than large employers. Hence one might expect a positive correlation between *E/U* and *ADV*, and negative between *E/U* and *PA* and possibly *E/U* and *CMC*. The following argument, presented by Stigler, would, however, lead to the exact opposite set of correlations:

> "The small company has distinct advantages in the hiring process, so far as judging the quality of workers is concerned. The employer can directly observe the performance of the new worker and need not resort to expensive and uncertain rating practices to estimate the workers' performance. It is well known that wage rates are less in small plants than in large, and the difference reflects at least in part (and perhaps in whole) the lower costs to the small scale employer of judging quality."[1]

It is assumed that all employers do, however, do some prescreening before allowing a worker into the work place, and they must at least choose among several applicants in some manner to decide whose performance to observe.

The *AWW* variable is included in order to test the hypothesis that employers who pay "high" wages can use low-cost methods of search, probably included in the *OTH* category. The simple correlation between *AWW* and *PA* will be high, due to the concentration of private agencies on professional, technical, and managerial occupations, which are generally among the higher-paid occupations. Because of this and the point previously noted, that differences among industries in the selection

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[1]Stigler, "Information in...", p. 102.

of search methods are largely due to differences in the occupational composition of the activity count, *PTM* and *CS* are added as independent variables.

All of the hypotheses used here are formulated with regard to the behaviour of individual hiring units within the industry -- not the behaviour of the "industry". The deficiency in trying to test such hypotheses, using "average" characteristics of the industry, should be obvious, but this is the best that can be done with the data available. In any event, I would emphasize that the tests are "weak" and the results only suggestive.

Because of two primary considerations, it was decided not to use multiple regression as the technique of analysis. First, many of the independent variables chosen are, at least partially, substitutes for one another; thus multicollinearity is apt to be a serious problem. The theoretical development, both in this Study and in the existing literature, is not rich enough to provide clear guidelines for specification of equations; hence an attempt to perform regression analysis would evolve into a "fishing expedition" of iterative respecification. Second, the four dependent variables are not, themselves, independent of one another, in that the sum of the four dependent variables for any industry must always equal 100 per cent. The technique chosen for analysis is multiple-discriminant-function analysis, which, while not ideally suited to the problem at hand, at least avoids some of the problems of classical regression.[1]

This technique attempts to classify the elements of some population into some number of subclasses on the basis of a vector of characteristics associated with

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[1]For a somewhat more elegant statement of this argument, see Irma Adelman and Cynthia Taft Morris, "Performance Criteria for Evaluating Economic Development Potential: An Operational Approach", *The Quarterly Journal of Economics*, May 1968, pp. 260-61.

each element.[1] The results of this classification can then be compared with the actual division into the given subclasses to see "how well" the vector of characteristics serves as a basis for classification. This process is performed stepwise by variable in the characteristics vector, introducing at each step the most discriminant variable from the set of variables not yet introduced. This is obviously still a "fishing expedition", but at least it is overt and based upon objective rules.[2]

In our case, an element is defined to be an activity count; the subclasses are the four "dependent" variables; and the characteristics vector is composed of the values of the independent variables corresponding to each activity count. The intuitive appeal of treating the "dependent" variables as subclasses should be apparent; they *are* mutually exclusive and exhaustive subsets of the set of all activity counts.[3]

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[1]For a more technical description of the technique of multiple-discriminant-function analysis, see C. R. Rao, *Advanced Statistical Methods in Biometric Research* (New York: Wiley & Sons, 1952), and T. W. Anderson, *Introduction to Multivariate Statistical Analysis* (New York: Wiley & Sons, 1958). A slightly simpler exposition of the general concepts is found in D. F. Morrison, *Multivariate Statistical Methods* (Toronto: McGraw-Hill, 1967). Since the manner in which the results may be reported varies somewhat, depending upon the computer program used, it should be noted that the program used herein is explained in *Biomedical Computer Programs* (Los Angeles: Health Sciences Computing Facility, Department of Preventive Medicine and Public Health, School of Medicine, University of California, revised September 1965), pp. 587-605.

[2]Similar "objective rules" could, of course, be used in regression analysis but are generally either not used or not reported.

[3]This follows only as long as the activity count is viewed as the unit of analysis. If the industry is viewed as the unit of analysis, we no longer have mutual exclusion, as a given industry may list some activity counts with each of the four classes of search methods.

Multiple-discriminant-function analysis, as briefly and crudely described above, is obviously most appropriate when applied to micro-observations. In the current application, we used a total activity count (total -- not averaged over six occasions) of 1,895, but since the elements of the characteristics vector vary only by industry, we only have 43 "distinguishable" characteristics vectors. Thus the discriminatory power of the variables in the characteristics vector depends not only on the values of these variables, but primarily on their relative frequency.[1]

The first output of the analysis, useful for descriptive purposes, is a table of means for the independent variables by subclass. Simply by looking at these means, certain patterns can be observed.[2] The means for the *EI* variable are not very different among subclasses, leading one to speculate that this variable has little power to discriminate. Large values of *AWW* and *PTM* are associated with private agencies, as expected because of the occupational composition of private agency listings. Large values of *A/E*, *ΔEI*, and *CS* are associated with advertising, more or less as expected. Large values of *E/U* are associated with private agencies, which tentatively substantiates Stigler's argument regarding the ability of small firms to evaluate their workers "on the job". This implies that large firms use private agencies more than small firms, although it must be remembered that the apparent fact that industries with a "large"

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[1]To make the point another way, the characteristics vectors for activity counts, listed with all four of the subclasses of search methods, are identical for a given industry. One consequence of this is that the scatter diagrams, usually produced as part of the output of multiple-discriminant-function analysis, are not very useful in the current case in that they look the same for all four subclasses; i.e., they contain the same points, except in the case where a given industry listed no activity counts with some search method. The means will, of course, differ, since the points are represented with differing multiplicity in the different subclasses.

[2]Without also considering variances and co-variances one cannot, of course, prejudge the results of the discriminant analysis.

average number of employees per establishment utilize private agencies to a disproportionate extent does not imply that the individual employers within these industries that actually listed vacancies with private agencies were "large".[1] This phenomenon should be investigated with establishment data on private agency usage to get a better picture of the employer clientele of private agencies.

Table 30

VARIABLE MEANS, CANADA

Variable	Subclass				
	CMC	*ADV*	*PA*	*OTH*	Total
EI	138.6	141.1	132.9	135.2	138.5
AWW	122.6	123.9	139.7	123.0	124.4
A/E	10.7	17.1	11.2	13.5	14.3
E/U	108.0	83.5	138.2	110.0	99.8
ΔEI	0.6	1.8	0.8	0.6	1.2
PTM	18.2	19.2	28.8	17.1	19.1
CS	33.8	46.8	33.9	41.1	41.3

The results of the discriminant analysis were generally disappointing, in that the first function explained only 7 per cent of the dispersion; the second, 5 per cent; and the third, about 1 per cent.[2] The order in which the variables were introduced, which is a measure of their relative power of discrimination, together with their associated *F* values, is shown in Table 31. All *F* values except the last are significant at the .05 level.

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[1]Remember also that the reporting units (usually establishments) included in the *U* count exclude units with less than 20 employees. See "Notes" at the end of Statistics Canada, *Employment and Average Weekly Wages and Salaries* (Ottawa, any recent issue).

[2]When *k* subclasses are used, at most *k*-1 independent discriminant functions can be obtained. Although these percentages are "small", each of the discriminant functions does explain a portion of total variation that is significant at the .05 level using Rao's approximate test. See Rao, *op. cit.*, pp. 372-73.

Table 31

VARIABLES INTRODUCED AND *F* VALUE TO ENTER OR REMOVE, CANADA

Step	Variable	*F*
1	*A/E*	34.33
2	*PTM*	17.01
3	*E/U*	10.88
4	*CS*	6.76
5	*EI*	6.03
6	*ΔEI*	6.77
7	*AWW*	1.55

Tables 30 and 31 taken together indicate that *A/E* is the strongest variable, and those industries with large numbers of activity counts per person employed tend to use advertising heavily and *CMC*'s the least. Given *A/E*, *PTM* is the next most discriminant variable, and so forth. Given the very low explanatory power, the actual discriminant functions are not reported herein, but Table 32 gives the subclass means for the normalized discriminant functions.

Table 32

SUBCLASS MEANS, CANADA

	Function		
Subclass	First	Second	Third
CMC	.31	.16	-.12
ADV	-.30	-.03	-.02
PA	.37	-.77	-.00
OTH	.12	.10	.16

The subclasses are not distinct from one another, due to the nature of the data, as previously noted, and the means are not very well separated. This may be seen by noting that for the first two functions, for all subclasses (ignoring extreme "flyers") the discriminant scores range from about plus to minus two, with all four means near the centre of the common "scatter".

The final bit of evidence presented on the discriminant-function analysis is a table showing the percentage of activity counts properly classified by the procedure described on pages 64 and 65. For no subclass were as many as 50 per cent of the activity counts properly classified. Overall, 38.9 per cent of the activity counts were properly classified.

Table 33

CLASSIFICATION RESULTS, CANADA

Actual Subclass		Predicted Subclass (Per cent)			
Name	Activity Count	*CMC*	*ADV*	*PA*	*OTH*
CMC	456	45.8	21.7	18.0	14.5
ADV	830	30.8	45.4	17.5	6.3
PA	126	19.0	30.2	44.4	6.4
OTH	483	32.5	26.9	20.7	19.9

The other basic source tabulation allowed analysis similar to the above to be conducted by regions, except that the number of industries that could be used was decreased considerably since the reported output of the Employment and Payrolls Survey[1] does not include information for as detailed an industry breakdown for regions as it does for Canada as a whole. The occupational mix variables are unfortunately unavailable for regions from the source tabulations utilized. The analysis was performed for only two regions, Quebec and Ontario, since there were insufficient observations in other regions to allow meaningful analysis. The object of this exercise is to ascertain if different responses in the selection of search methods to values of the independent variable are apparent in different regions.

Only eight industries could be utilized for the regional runs, with a total of 354 activity counts in Quebec and 765 in Ontario. The variable means are shown in Table 34. Comparison of the items in the "total" column for Quebec with those for Ontario, or indeed of either of these with the totals for Canada in Table 30 is not very meaningful, since differences are due to regional variations in the values of the variables as

[1]Dominion Bureau of Statistics, *Employment and Average Weekly Wages and Salaries* (Ottawa, May 1968).

well as regional variations in the industry breakdown of the activity count. Comparing patterns within regions, it is noted that low values of the *EI* variable are more strongly associated with the use of private agencies in both regions than was true for Canada as a whole. The *AWW* variable does not appear to discriminate very well in Quebec, while the Ontario pattern is similar to that for Canada. The reverse holds for the *A/E* variable, with the Quebec pattern appearing similar to the Canadian. The result of large *E/U* being associated with private agencies holds in both regions as well as Canada. "Large" ΔEI are associated with *ADV* in Quebec (and total Canada) with a less clear pattern in Ontario.

Table 34

VARIABLE MEANS, QUEBEC AND ONTARIO

	Quebec					Ontario				
Variable	*CMC*	*ADV*	*PA*	*OTH*	Total	*CMC*	*ADV*	*PA*	*OTH*	Total
EI	134.9	131.7	118.6	130.4	130.3	139.2	144.6	126.0	136.9	139.8
AWW	112.8	119.0	123.9	118.4	118.3	125.0	121.1	142.2	124.9	124.8
A/E	6.5	12.2	6.7	9.2	9.6	8.8	11.5	11.1	9.7	10.3
E/U	82.1	82.1	94.8	84.1	84.2	86.0	82.3	103.2	91.0	87.1
ΔEI	0.3	1.3	-0.6	0.7	0.7	1.4	2.4	2.0	2.0	2.0

Only two discriminant functions explain a significant portion of total variation in Quebec, the first accounting for 13 per cent and the second 6 per cent. In Ontario, the first accounts for 10 per cent; the second, 6 per cent; the third, 1 per cent -- all significant at the .05 level. The order in which the variables were introduced is shown in Table 35. All *F* values for Ontario are significant; only the first two are significant in Quebec. The principal difference between Tables 31 and 35 is that *EI* appears to be a more important variable in the regions than it was for Canada, with the reverse true for *E/U*.[1]

[1] Rerunning the total Canada analysis without the occupation-mix variables, in an attempt to gain greater comparability with the regional analyses, results in the following order for introducing variables: *A/E*, *AWW*, *E/U*, ΔEI, *EI*. With the *PTM* variable missing, the *AWW* variable apparently serves as a proxy -- an effect that is curiously not very strong in the regional analyses. It should be noted that the total Canada "rerun" still uses 43 industries versus 8 in the regions, so exact comparability is not attained.

Table 35

VARIABLE INTRODUCED AND *F* VALUE TO ENTER OR REMOVE, QUEBEC AND ONTARIO

Step	Quebec		Ontario	
	Variable	*F*	Variable	*F*
1	*A/E*	14.3	*EI*	17.2
2	*EI*	9.4	*A/E*	12.8
3	*ΔEI*	0.7	*ΔEI*	6.8
4	*AWW*	0.5	*AWW*	6.9
5	*E/U*	0.1	*E/U*	4.7

The *A/E* variable is either the most discriminant or next most discriminant in all three analyses, large values being associated with *ADV* and small values with *CMC*. This lends some support to the screening cost argument stressed by Ullman[1] if it is assumed that firms which have relatively large numbers of vacancies also are likely to have screening capacity. Alternatively, it may be that firms having a high *A/E* ratio have high quit rates, causing the expected duration of employment to be short, leading to a low *MRP**, in the notation of Chapter 3. This would in turn imply that only low-cost methods of search should be utilized. It remains an unproven proposition that advertising is a low-cost method of search, remembering that screening costs are included in search costs. In any event, the effects of *A/E* merit further study, as briefly outlined in the concluding section of this Study. The occupation-mix variables appear to be important, and *EI* merits further consideration. *AWW* does not appear to be very important, but other studies have found evidence of a negative relationship between search activity and high wages,[2] and it seems logical that there should be some relationship between search method and wage levels. Further analysis is needed using information on offer wage rates (available from the Job Vacancy Survey) to more fully investigate the effect.

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[1]Ullman, *op. cit.*, pp. 157-58.

[2]George P. Shultz, "A Non-Union Market for White-Collar Labor", *Aspects of Labor Economics* (Princeton, N.J.: Princeton University Press for the National Bureau of Economic Research, 1962).

One major conclusion that emerges is that, while overall variations in the percentage of activity counts listed with specified methods may not vary significantly by region, the response of selection of method to different characteristics of the employer does appear to vary by region. Hence in subsequent analyses of employer behaviour, it would be highly desirable to perform the analysis for geographic units smaller than the nation. The amount of disaggregation possible depends, of course, on the nature of the data.

Additional detailed results from the discriminant analyses for the two regions are not reported herein. By and large, the group means are not very well separated, and only 36.4 per cent of the activity count in Quebec is properly classified, compared with 40.3 per cent in Ontario.

A small amount of regression analysis was undertaken to utilize the information for regions other than Quebec and Ontario. Three dependent variables are utilized, defined as the percentage of the total activity count within an industry and region listed with *CMC*, *ADV*, and *PA*. Forty observations are thus available (eight industries times five regions). The independent variables are as previously defined, except for the addition of regional dummies. The following represents the "best" results obtained, using very limited experimentation in specification:

$$(5.1)\quad CMC = \underset{(.01)}{-0.146} + \underset{(3.18)}{0.289}*EI - \underset{(.41)}{.134}\Delta EI - \underset{(3.50)}{11.052}\,A/E - \underset{(1.94)}{9.372}\,\text{QUEBEC} \qquad \bar{R}^2 = .29$$

$$(5.2)\quad ADV = \underset{(3.41)}{44.065} - \underset{(1.19)}{0.100}AWW + \underset{(2.07)}{7.620}*A/E + \underset{(1.74)}{10.801}\,\text{PRAIRIE} \qquad \bar{R}^2 = .21$$

$$(5.3)\quad PA = \underset{(.88)}{11.891} - \underset{(2.27)}{0.169}*EI + \underset{(1.41)}{0.073}AWW + \underset{(2.20)}{.558}*\Delta EI + \underset{(1.18)}{2.983}A/E + \underset{(1.73)}{6.949}\,\text{QUEBEC} + \underset{(2.58)}{9.632}*\text{ONTARIO} \qquad \bar{R}^2 = .30$$

The asterisk denotes significance at the .05 level, and the *t* values are shown in parentheses beneath the coefficients. The *A/E* variable is significant in two of the three equations, with the signs agreeing with expectations based on the discriminant analysis. The *EI* variable is significant in two of the three equations, and ΔEI is significant in the private agencies equation. The signs in the *PA* equation are as expected, but *a priori* analysis would have indicated a negative sign for *EI* in the *CMC* equation.

It was noted at the beginning of this chapter that the tabulations for the January-through-March period counted three concepts: activity counts, total vacancies, and total full-time vacancies. From this information two interesting ratios can be derived -- namely, average vacancies per activity count and part-time vacancies as percentage of total vacancies. Given the nature of the data, no statistical tests were performed, but descriptive results are presented below. Cross-tabulations would yield too few observations per cell to be reliable, so only marginal figures are presented. Table 36 presents summary information.

With regard to average vacancies per listing, it appears that unions, advertising, and *CMC*'s rank above average. Private agencies rank lowest. The pattern among occupations is more or less as expected -- low values for white-collar and high for blue-collar. Regionally, average vacancies per listing decline as one moves from east to west across the country -- a pattern for which I have no explanation.

The pattern among search methods lends some support to the screening-costs argument, if it is assumed that private agencies do more screening than other methods, including *CMC*'s. Note that the premise does not imply that private agencies do a good job of screening, but merely that they refer very small numbers of applicants to the employer -- in the limit, one per vacancy. As the number of vacancies per job title increases, the employer may become more willing to undertake screening himself, as he may be able to reap at least minor economies of scale.

Table 36

SUPPLEMENTARY DATA ON SEARCH

Category	Average Vacancies per Activity Count	Part-Time as Percentage of Full-Time Vacancies
Search Method		
Canada Manpower Centre	1.89	2.5
Advertising	1.96	2.6
Unions	3.42	9.1
Walk-in interviews	1.76	17.5
Search of files	1.45	0.8
Private employment agencies	1.14	--
Universities and other schools	1.32	--
Personal contact	1.36	11.3
Employee referral	1.42	--
Other or not specified	1.43	3.1
Occupation		
Professional, technical, and managerial	1.18	0.3
Clerical and sales	1.23	5.8
Service	2.56	9.9
Farming, fishing, and forestry	1.88	--
Processing	3.86	1.2
Machine trades	1.92	0.3
Bench work	3.29	--
Structural	3.69	2.2
Other	3.07	3.9
Region		
Atlantic	2.13	1.8
Quebec	1.82	1.2
Ontario	1.81	2.6
Prairie (including N.W.T.)	1.67	2.0
British Columbia (including Yukon)	1.36	12.0
Overall Mean	1.75	3.2

Informal methods, particularly walk-in interviews and personal contact, are heavily utilized for part-time vacancies. If we assume these to be low-cost methods of search, this result is consistent with the theory of Chapter 3, since part-time employees will have a relatively low *MRP**, leading to the use of low-cost methods. The occupational pattern in part-time, as a percentage of full-time, vacancies is also generally as expected: I have no explanation for the high percentage in this column for British Columbia.

Overall, the empirical analysis in this chapter has been indicative, not definitive, due at least partly to data deficiencies. The following chapter outlines some recommendations for further analysis and data development.

CHAPTER 6

CONCLUSIONS, COMPARISONS, AND RECOMMENDATIONS FOR FURTHER RESEARCH

The two major recommendations for further research made herein are that:

(1) a survey similar to that conducted in January 1969 should be performed, with some modifications as suggested below; and

(2) some additional tabulations from the Job Vacancy Survey should be analysed.

The reasons for rerunning the worker search survey include the fact that 1968 was generally a period of low unemployment, and the literature footnoted in Chapter 2 indicates that search behaviour differs with the state of the market. I would thus suggest some year characterized by relatively high unemployment as an appropriate reference period. Another reason for rerunning this survey is that certain potentially useful information was not gathered. The duration of the spell of unemployment to which the "drop-off" responses pertain is noteworthy. It would also be desirable to have some indication of the period of the year when the spell of longest duration occurred, so that the effects of seasonal variations in economic activity could be investigated. Some further recommendations regarding information that could be collected arise in the comparisons with other studies discussed below. It is recognized that attempting to gather too much information via a "drop-off" questionnaire can have seriously adverse effects on the response rate.

The Job Vacancy Survey is a "gold mine" of information pertinent to job market search behaviour. When sufficiently long time series of data are available, one can perform all of the obvious analyses of seasonal and cyclical patterns, but as immediate steps I would suggest two. First, a tabulation should be performed on activity counts aggregated over a full year -- by search method, by occupation, by industry, by region. Much better analysis can be performed on a four-way table

than is possible using three three-way tables. Aggregating over a year reduces the incidence of empty cells and cells with very small sample counts, thus reducing the necessity for extreme aggregation and providing more "degrees of freedom" for empirical analyses. Second, I would suggest exploitation of the information collected by the JVS on hiring rates. Much of the literature cited in Chapter 3, and indeed common sense, suggests that hiring rate data are fundamental in analysing employer search behaviour. It should be noted that the JVS does not collect data on the rates actually paid to the persons accepting jobs; indeed, the survey collects no information on how jobs are actually filled, but rather on how employers try to fill vacancies. The hiring rates to which I refer are thus actually "offer rates".

There are really only two studies of which I am aware with which the results in Chapter 4 can reasonably be compared. Both of these studies were performed in the United States, and neither is national in scope. Sheppard and Belitsky[1] analysed the search behaviour of a sample of workers drawn from the files of the State Employment Service of Erie, Pennsylvania, who had been seeking work sometime between January 1963 and March 1964. The Erie area was essentially characterized by slow employment growth and high rates of unemployment. The sources of noncomparability between their sample and total Canada in a year characterized by relatively low unemployment in Canada are obvious. With this in mind, and without making some of the comparisons possible between the two samples regarding median age, education levels, and other characteristics of job seekers, one may note the following results. In the Canadian sample about 44 per cent of job seekers began search immediately after leaving their previous job; Sheppard and Belitsky report 32 per cent. About 14 per cent of the Canadian sample waited two weeks or more; the U.S. study reports 13 per cent.[2] A larger portion of the Erie, Pennsylvania, workers than Canadian workers did not search at all -- a finding consistent with the generally depressed economic conditions in Erie and the fact that a larger proportion of the Erie workers expected recall to a former job.[3]

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[1]Sheppard and Belitsky, *op cit.*

[2]Tables 23 and 25 in this Study; and Sheppard and Belitsky, *op. cit.*, p. 32.

[3]Sheppard and Belitsky's sample includes persons who were unemployed for less than five weeks.

Both the Canadian and U.S. studies found that males and females use the public employment service to about the same extent; and males are more likely than females to contact local employers. The Erie sample found that males and females use newspapers to an equal extent; the Canadian data indicate that females are more likely than males to use this method of search. Both studies indicate that females are less likely than males to use friends and relatives. Sheppard and Belitsky report the following percentages of blue-collar job seekers using specified methods (Canadian percentages in parentheses): public employment service, 84 per cent (76 per cent); private agencies, 17 per cent (17 per cent); local employers, 72 per cent (67 per cent); local papers, 88 per cent (22 per cent); and friends and relatives, 77 per cent (55 per cent).[1]

Adding up the percentages in Sheppard and Belitsky's table[2] implies that blue-collar workers used an average of 4.3 search methods, while Table 5 in this Study provides a figure of 3.2 methods. The Erie study provided information on the "total number of companies checked by blue-collar workers in looking for jobs".[3] The average number was 10, but about 25 per cent of the males had inquired with 15 or more firms, and 7 per cent with more than 30. It would be extremely interesting to gather similar information for Canada, to attempt to get at some measure of intensity of search beyond the crude "number of methods used" proxy used in this Study. Perhaps some question could be added to the "rerun" of the Labour Force Survey "drop-off" previously suggested.

With regard to job-finding success, the Erie study found that among those blue-collar workers not called back to a previous job, 77 per cent of those who began search within six days of leaving their previous employment found jobs, versus 64 per cent of those who waited

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[1]The information in this paragraph comes from pages 44-46 in Sheppard and Belitsky, *op. cit.*, and the survey discussed in Appendix A of this paper. The Canadian percentages reported are also for blue-collar workers only.

[2]*Ibid.*, p. 45.

[3]*Ibid.*, p. 54.

a week or more.[1] This exact categorization could not be made with the Canadian data, but there did not appear to be any statistically significant difference in job-finding behaviour by time elapsed before initiation of search category. Sheppard and Belitsky note that:

> "...77 percent of the workers who found new jobs used four or more job-finding techniques, as compared to only 64 percent of the still unemployed. This difference suggests (but only tentatively) a meaningful relationship between number of techniques used and successful job finding."[2]

The same effect appeared quite strongly in the Canadian data in Tables 1 through 4.

The Erie study also reports percentages by search method on "how blue-collar workers re-employed at new jobs first heard about their jobs".[3] While these are not exactly comparable with the Canadian data for a number of definitional reasons, even a rough comparison yields the result that both surveys indicate informal methods to be very effective. By search method (Canadian data in parentheses),[4] the percentages are: friends and relatives, 56 per cent (25 per cent); direct company application, 14 per cent (42 per cent); public employment service, 14 per cent (14 per cent); unions, 5 per cent (5 per cent); newspaper ads, 4 per cent (6 per cent); all other, 7 per cent (8 per cent). The major difference between the two studies appears to be a switch in relative importance between friends and relatives and direct company application. This may be due to a difference in wording between the two questionnaires, as a substantial number of Canadian workers who indicated "local employers" as the successful method of search may have first learned of the opening from friends and relatives.

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[1] *Ibid.*, p. 69.

[2] *Ibid.*, p. 88.

[3] *Ibid.*, p. 89.

[4] Canadian data are for blue-collar workers only.

Overall, without attempting to correct for the obvious sources of noncomparability, it appears that the patterns of similarity between the Erie study and this one are more striking than the differences.

The other study that contains information reasonably comparable covers the Chicago-Northwestern Indiana Consolidated Area as defined in the census of 1960. The results of this study are reported in Rees and Shultz,[1] and I will refer to it as the Chicago Labor Market Study (CLMS). The CLMS examined selected occupations only, making comparisons with the Canadian data difficult. Hence most of the comparisons reported herein are limited to verbal generalities. The CLMS found that the most important informal job source was "employee referral",[2] with "gate application" much less important. Since the CLMS category of "employee referral" is roughly equivalent to our category of "friends and relatives", the CLMS results accord with those of the Erie study but not the Canadian data. The CLMS found that "in no occupation were as many as three percent of the workers known to have found their jobs through the employment service",[3] which is in contrast to the 14-16 per cent figures found by the Erie study and the Canadian data. The CLMS found private agencies to be important only in the white-collar occupations, as did the Canadian study. Rees and Shultz also emphasize the screening-capacity argument: "Many of our employers reported satisfaction with the referrals from private agencies; these tended to be the smaller employers who had less capacity to do extensive screening within their own personnel department."[4] Most of the analytical work in the CLMS included some consideration of a wage rate variable. When studies utilizing wage rates are conducted using Canadian data, the CLMS will serve as a useful source of hypotheses and comparisons.

A similar comment may be made regarding the Erie study, which stressed the gathering of qualitative information on motivation in addition to the quantitative

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[1] Rees and Shultz, *op. cit.*

[2] *Ibid.*, p. 200.

[3] *Ibid.*, p. 204.

[4] *Ibid.*, p. 205.

information on search behaviour. When similar information is collected in Canada, the Erie study will be very useful for comparison.

I have suggested some directions for empirical research; it remains to discuss directions for theoretical development. A potentially major deficiency of most theories developed to date -- certainly the brief theories presented in Chapters 2 and 3 -- is that they are theories of search, not theories of information. One immediate consequence of this is that theories of employer and worker search behaviour exist in isolation; there is no theory of the "information market". In this Study this deficiency is defended on the argument that the data sets are for various reasons not compatible enough to be combined into an overall analysis of the market, and the theories presented are sufficient to justify the limited empirical testing performed.

It is felt that a theory of the "information market" is needed before an understanding of search behaviour can serve as a sufficient guide to public policy decisions regarding reductions in the duration of frictional unemployment or improving the worker-job "matching" process. While information concepts underlie the entirety of the analysis in this Study, these concepts recognize the properties of information only in part. Following Stigler,[1] information is treated essentially as an "economic commodity"; it has a cost and yields benefits (utility). But simply introducing information into the utility function as another "commodity" ignores the fact that utility functions are defined "tastes and preferences given", and information plays a primary role in changing "tastes and preferences".

Information, viewed as a commodity, has several very unusual (for a commodity) properties. The same information may be available in several places at once, at widely varying prices. This is partially due to the fact, noted by Arrow,[2] that the purchaser of information

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[1]Stigler, "The Economics of Information", and "Information in....".

[2]Kenneth J. Arrow, "Economic Welfare and the Allocation of Resources for Invention", in *The Rate and Direction of Inventive Activity: Economic and Social Factors*, A Conference of the Universities (New York: National Bureau of Economic Research, 1962), p. 615.

rarely knows the value of what he is purchasing until he receives it, at which point it is impossible to return it for a "refund". If one can define a "piece of information" -- call it a "message" -- this message is usually indivisible (more accurately the message may have an economic value, while no part of it in isolation has value) and, at least *a priori*, unique.

Some of these elements have been recognized in the literature on labour markets. For example, Rees goes part way in recognizing uniqueness by dividing job market information into two types, extensive and intensive.[1] Extensive information concerns the availability and very general attributes of job openings or job seekers. Intensive information concerns more detailed attributes of the job or worker and is often a subjective assessment on the part of the person transmitting the message. Weber[2] implies that this distinction may explain the importance of informal search methods in worker search. Reliable intensive information is often available only through informal channels.

This Study concludes on essentially the same note on which it began. An understanding of the processes and motivations underlying behaviour in the job market is of potentially great usefulness in formulating economic policy. Additional research is needed at both the theoretical and empirical levels; indeed, analysis of job markets is a relatively underresearched area compared to many other markets. Hopefully, this Study will generate further work in this area in the Canadian setting.

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[1]Rees and Shultz, *op. cit.*, p. 560-61.

[2]Arnold R. Weber, "The Role and Limits of National Manpower Policies", *Proceedings of 18th Annual Winter Meeting*, Industrial Relations Research Association, Madison, Wisconsin, 1965, pp. 48-49.

APPENDIX A

The data utilized in Chapter 4 are derived from a special "drop-off" questionnaire appended to the January 1969 Labour Force Survey (LFS). The "drop-off" and the regular LFS schedule are reproduced as the last four pages of this appendix. It should be noted that the questions on annual work experience (questions 32-43) on the regular LFS schedule are not usually included in the survey; i.e., this is information gathered infrequently. The "drop-off" was given only to those persons in the sample who had experienced a cumulative total of five or more weeks of unemployment in the calendar year 1968. It was requested that these persons answer the questions on search behaviour with regard to their longest continuous spell of unemployment during 1968.

One piece of information that unfortunately was not collected was the duration of this longest spell, which would have been very useful as a dependent variable. Some empirical work was performed, using total weeks of unemployment in 1968 as a proxy for this, but the results, while interesting, were plagued with problems of statistical nonsignificance and "incorrect" signs for crucial coefficients. This may of course have been the "real" phenomenon, but as a matter of judgment it was decided to be a case of an inappropriate proxy variable. The measure of success used in the absence of a good duration proxy was *JFY*, a dummy set equal to unity if the answer to question 3 on the "drop-off" was "yes", and zero otherwise.

The method-of-search categories used are shown under question 2 on the "drop-off", and the number of methods used (*NMS*) variable is simply a count of the number of boxes checked in response to this question. The method categories used in Table 1, for example, aggregate the two methods used outside the locality (employers and papers) into one group and aggregate trade unions with "other action".

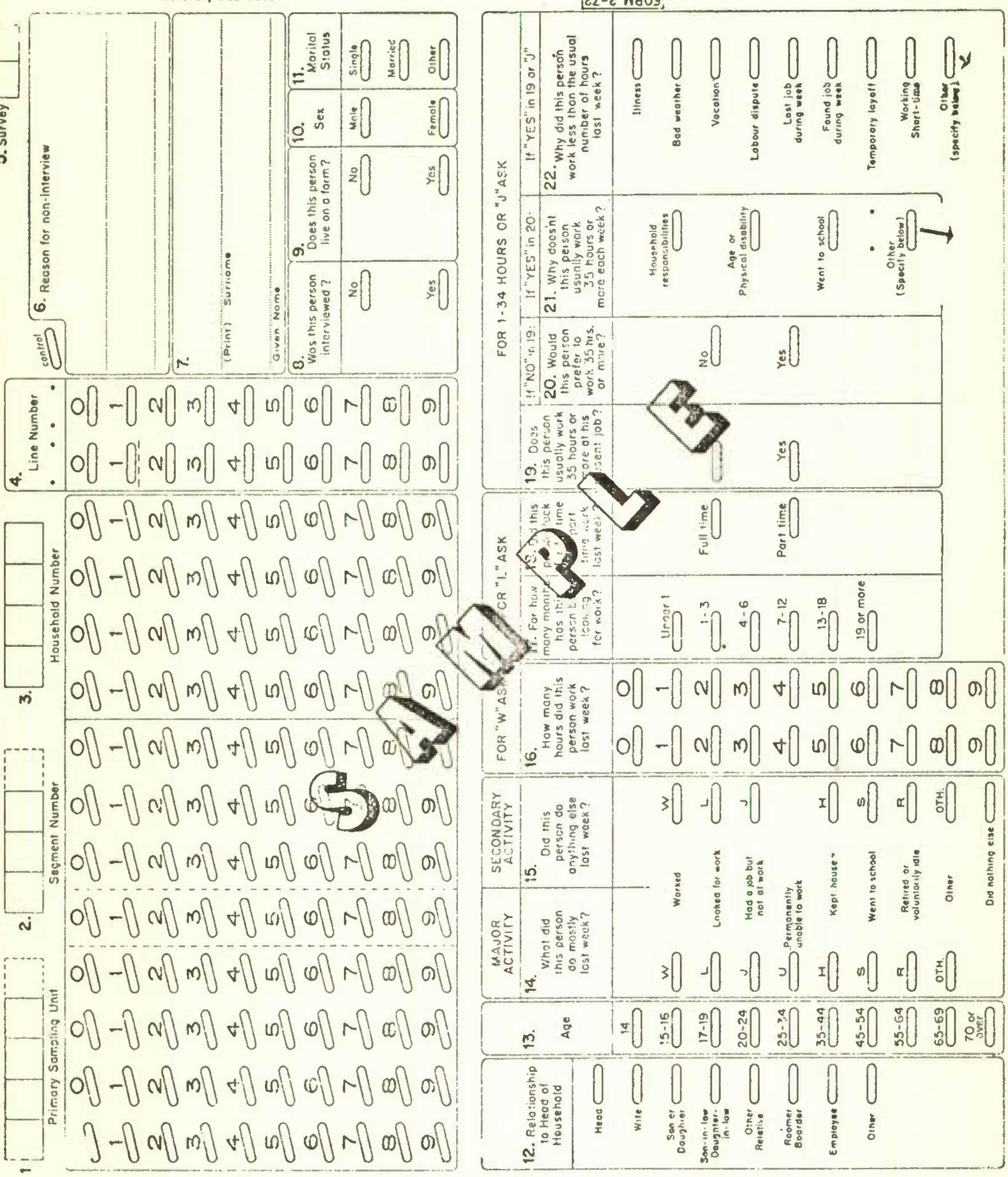
The job type variable is unity if the answer to question 5 is the first box; zero, otherwise. The sex, age, education, and marital status variables come from questions 10, 13, 30, 11, respectively, on the regular questionnaire. The industry and occupation variables are the coded responses to questions 24 and 25 on the

regular questionnaire. The occupation categories "professional, technical, and managerial" and "clerical and sales" are aggregated to form "white-collar"; all other occupations are included in "blue-collar". Agriculture, Forestry, Fishing and Mining comprise "primary" industry; Manufacturing and Construction comprise "secondary" industry; all others are included in "tertiary".

The search status variable in equation 4.2 is unity if the last box was checked in response to question 2 on the "drop-off", zero, otherwise. The "no-previous-job" group noted in Table 26 consists of those persons who checked the first box in response to question 1 on the "drop-off".

All data were used in weighted form -- weighted by the sample weights appropriate. The degrees of freedom for all statistical tests are deflated to an actual-number-of-sample-observations basis. A small amount of experimentation with both weighted and unweighted data disclosed that it did appear to make a small amount of difference how the data were used, although one form did not appear to be any more "tractable" than the other. It is felt that the weighted data are more appropriate.

In contrast with the data set discussed in Appendix C, where data were drawn off from a survey in a preliminary stage, there is no reason known to the author why the data discussed here should be questioned on technical grounds. Since the sample is retrospective over a year, there may be some problems of recall, but directions of recall bias are difficult to specify. Possibly the total number of methods used is understated, for example. If there are biases -- due to the manner in which a question was worded, for example -- the reader can judge this for himself as the questionnaire is reproduced on the following pages. The effects of response bias are unknown.



LABOUR FORCE SCHEDULE (Form 2) - Complete a schedule for every member of the household 14 years of age or over

1. Primary Sampling Unit

2. Segment Number

3. Household Number

4. Line Number

5. Survey

control

6. Reason for non-interview

7. (Print) Surname

Given Name

8. Was this person interviewed? No / Yes

9. Does this person live on a farm? No / Yes

10. Sex: Male / Female

11. Marital Status: Single / Married / Other

12. Relationship to Head of Household: Head / Wife / Son or Daughter / Son-in-law Daughter-in-law / Other Relative / Roomer Boarder / Employee / Other

13. Age: 14 / 15-16 / 17-19 / 20-24 / 25-34 / 35-44 / 45-54 / 55-64 / 65-69 / 70 or over

MAJOR ACTIVITY

14. What did this person do mostly last week?

SECONDARY ACTIVITY

15. Did this person do anything else last week?

W Worked W

L Looked for work L

J Had a job but not at work J

U Permanently unable to work

H Kept house H

S Went to school S

R Retired or voluntarily idle R

OTH. Other OTH.

Did nothing else

FOR "W" ASK

16. How many hours did this person work last week?

FOR "L" ASK

17. For how many months has this person been looking for work? Under 1 / 1-3 / 4-6 / 7-12 / 13-18 / 19 or more

18. Did this person look for full time or part time work last week? Full time / Part time

FOR 1-34 HOURS OR "J" ASK

19. Does this person usually work 35 hours or more at his present job? Yes

If "NO" in 19: 20. Would this person prefer to work 35 hrs. or more? No / Yes

If "YES" in 20: 21. Why doesn't this person usually work 35 hours or more each week? Household responsibilities / Age or Physical disability / Went to school / Other (Specify below)

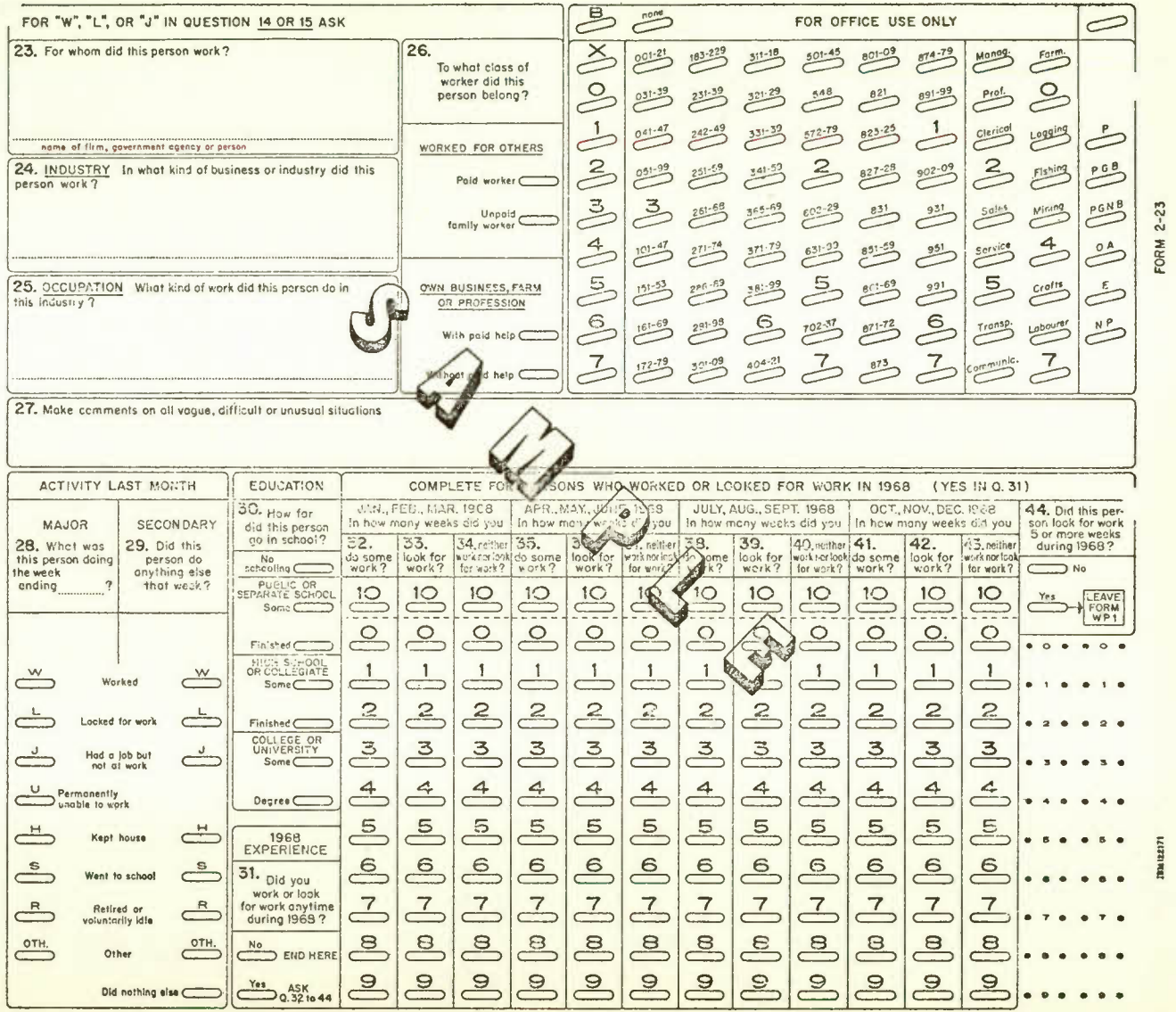
If "YES" in 19 or "J": 22. Why did this person work less than the usual number of hours last week? Illness / Bad weather / Vacation / Labour dispute / Lost job during week / Found job during week / Temporary layoff / Working Short-time / Other (specify below)

9604-35.1 / 13-8-64

FORM 2-72

SPECIAL SURVEYS DIVISION

DOMINION BUREAU OF STATISTICS



FOR "W", "L", OR "J" IN QUESTION 14 OR 15 ASK

23. For whom did this person work?

name of firm, government agency or person

24. INDUSTRY In what kind of business or industry did this person work?

25. OCCUPATION What kind of work did this person do in this industry?

26. To what class of worker did this person belong?

WORKED FOR OTHERS
- Paid worker
- Unpaid family worker

OWN BUSINESS, FARM OR PROFESSION
- With paid help
- Did not have paid help

FOR OFFICE USE ONLY

B | none

X	001-21	183-229	311-18	501-45	801-09	874-79	Manag.	Farm.
0	031-39	231-39	321-29	548	821	891-99	Prof.	0
1	041-47	242-49	331-39	572-79	823-25	1	Clerical	Logging
2	051-99	251-59	341-50	2	827-28	902-09	2	Fishing
3	3	261-68	365-69	602-29	831	931	Sales	Mining
4	101-47	271-74	371-79	631-99	851-59	951	Service	4
5	151-53	296-99	381-99	5	861-69	991	5	Crafts
6	161-69	281-98	6	702-37	871-72	6	Transp.	Labourer
7	172-79	301-09	404-31	7	873	7	Communic.	7

P
P G B
P G N B
O A
E
N P

27. Make comments on all vague, difficult or unusual situations

ACTIVITY LAST MONTH

MAJOR	SECONDARY
28. What was this person doing the week ending ..... ?	29. Did this person do anything else that week?
W Worked	W
L Locked for work	L
J Had a job but not at work	J
U Permanently unable to work	
H Kept house	H
S Went to school	S
R Retired or voluntarily idle	R
OTH. Other	OTH.
Did nothing else	

EDUCATION

30. How far did this person go in school?

- No schooling
- PUBLIC OR SEPARATE SCHOOL: Some / Finished
- HIGH SCHOOL OR COLLEGIATE: Some / Finished
- COLLEGE OR UNIVERSITY: Some / Degree

1968 EXPERIENCE

31. Did you work or look for work anytime during 1968?

- No — END HERE
- Yes — ASK Q.32 to 44

COMPLETE FOR PERSONS WHO WORKED OR LOOKED FOR WORK IN 1968 (YES IN Q. 31)

JAN., FEB., MAR. 1968 In how many weeks did you			APR., MAY., JUNE 1968 In how many weeks did you			JULY, AUG., SEPT. 1968 In how many weeks did you			OCT., NOV., DEC. 1968 In how many weeks did you			44. Did this person look for work 5 or more weeks during 1968?
32. do some work?	33. look for work?	34. neither work nor look for work?	35. do some work?	36. look for work?	37. neither work nor look for work?	38. do some work?	39. look for work?	40. neither work nor look for work?	41. do some work?	42. look for work?	43. neither work nor look for work?	No / Yes → LEAVE FORM WP1
10	10	10	10	10	10	10	10	10	10	10	10	
0	0	0	0	0	0	0	0	0	0	0	0	• 0 • • 0 •
1	1	1	1	1	1	1	1	1	1	1	1	• 1 • • 1 •
2	2	2	2	2	2	2	2	2	2	2	2	• 2 • • 2 •
3	3	3	3	3	3	3	3	3	3	3	3	• 3 • • 3 •
4	4	4	4	4	4	4	4	4	4	4	4	• 4 • • 4 •
5	5	5	5	5	5	5	5	5	5	5	5	• 5 • • 5 •
6	6	6	6	6	6	6	6	6	6	6	6	• • • • • •
7	7	7	7	7	7	7	7	7	7	7	7	• 7 • • 7 •
8	8	8	8	8	8	8	8	8	8	8	8	• • • • • •
9	9	9	9	9	9	9	9	9	9	9	9	• • • • • •

FORM 2-23

SAMPLE

DOMINION BUREAU OF STATISTICS WP 1

Name _____

PSU [ ] Seg. [ ] Hhld. [ ] Line No. [ ]

We are interested in finding out something about the way people look for work and find jobs. These statistics will be extremely valuable to those government agencies concerned with reducing the burden of unemployment in Canada. We would very much appreciate your co-operation in filling out this questionnaire.

Please answer the following questions about your longest (or only) spell of unemployment during 1968.

1. How long after losing your job did you begin looking for another job?

Please check (✓) the appropriate answer.

- ☐ had no previous job
- ☐ immediately - (before lay-off or one day after lay-off)
- ☐ 2 to 14 days after lay-off
- ☐ 2 weeks or more after lay-off
- ☐ did not look at all. Why not? ☐ Expected to be recalled to work.
  ☐ Other, explain _____

2. If you did look for work, what actions did you take? (PLEASE CHECK EACH METHOD YOU USED) Did you ...

- ☐ contact Canada Manpower Centre
- ☐ contact private employment agencies
- ☐ check with employers in your area
- ☐ check with employers outside your area
- ☐ place, or answer, advertisements in local papers
- ☐ place, or answer, advertisements in papers outside your locality
- ☐ write letters of application
- ☐ check with friends or relatives
- ☐ check with trade union.
- ☐ other action (Please explain _____)
- ☐ no action taken

(PLEASE TURN OVER)

9713-171.1 29/10/68

3. Did you find work as a result of this (these) action(s)?

☐ YES ☐ NO (still unemployed) ☐ NO (other)

Indicate reasons for not finding work

SKIP TO COMMENTS

4. Which method of looking was successful?

5. Was the job you found

☐ a former job to which you returned ☐ a new job?

6. Comments - make comments and explain any points which might not be clear to other persons -

9713-171.1

APPENDIX B

Most of the empirical analysis and data presentation in Chapter 4, and part of that in Chapter 5, consists of least-squares regression analysis using dummy variables. An understanding of the technique is thus necessary to evaluate the results. Although most readers will be familiar with the technique, there are some "degrees of freedom" in *how* dummy variable regression is utilized; thus a reasonably complete description of procedures followed is included here.[1]

The technique is applied to both micro-observations and cross-classified data in tabular form, and although the procedure is the same in both cases, interpretation of the results differs. The application to analysis of microdata is considered first in this appendix, using the equation in Table 1 as an illustration.

The independent variables of interest are divided into *factors* -- e.g., age; and then into the various *levels* within that factor -- e.g., 14-19 years. The only scale variable used in the analysis of worker search behaviour is the number of methods of search used (*NMS*). All other factors are represented by dummy variables. There may be any number of levels (greater than one) within a factor. For example, in Table 1, method of search has eight levels; sex has only two. One then defines a number of dummy variables equal to the number of levels of the factor minus unity. It is necessary to omit one level of each factor to prevent a certain matrix from becoming singular (assuming an intercept is estimated), which would make it impossible to compute coefficients. Using the age factor as an example, two dummy variables are defined -- call them A_1 and A_2.

---

[1]The following two sources were extensively utilized in deciding which technique to use and how to apply it. Emanuel Melichar, "Least-Squares Analysis of Economic Survey Data", *Proceedings of Business and Economic Statistics Section*, American Statistical Association, 1965, pp. 373-85; and N.H.W. Davis, "Some Methods of Analysing Cross-Classified Census Data: The Case of Labour Force Participation Rates", Dominion Bureau of Statistics, *Special Labour Force Studies*, Series B, No. 3 (Ottawa, July 1969).

A_1 is defined to be equal to unity for those persons aged 20-44 years; zero, otherwise. A_2 is defined to be equal to unity for those persons aged 45 years and over; zero, otherwise. Age level 14-19 years is the "omitted level".

When this has been done for all factors, the dependent variable is regressed on the full set of independent variables, mostly dummies. The coefficients resulting from this are shown in the column headed "Estimated Coefficient". These coefficients are interpreted as being the deviation in the value of the dependent variable between the level for which the coefficient is reported and the *omitted level* of the same factor. Thus in Table 1 the coefficient of -.1607 for age group 45 and over is interpreted to mean that persons in this age group were about 16 per cent less likely to have found a job than persons aged 14-19, given all the other factors in the equation.

The standard error of .0369 reported is the standard error of this difference. Hence to test the hypothesis that there is no significant difference in job-finding success between persons in age group 14-19 years and 45 years and over, one divides .1607 by .0369 to get 4.36, which is distributed as Student's t with total number of observations minus number of parameters estimated or 907 degrees of freedom. This t value is reported in Table 2, which will be more fully discussed shortly.

While this would be an adequate manner of reporting results, the ease and meaningfulness of reading the table depends upon which level within each factor is chosen to be omitted. The column headed "Adjusted Coefficient", calculable from the other information in the table, is thus prepared to facilitate reading of the results. The interpretation of the adjusted coefficients is that they are deviations not from the omitted level, but from the mean of the factor. Thus the adjusted coefficient of -.1283 for age 45 years and over means that persons in this age level had about 13 per cent less success in finding a job than the person of average age in the total subsample of 931 persons. Note that adjusted coefficients are thus reported for the "omitted level" as well. It is perhaps a sufficient definition of adjusted coefficients

to note that the sum of these coefficients, weighted by their respective variable means, equals zero within any factor.[1]

The variable means are of interest apart from their role in deriving adjusted coefficients, in that they provide a profile of the subsample. Thus 24.55 per cent of the persons in the subsample were aged 45 years and over. For all factors represented by dummy variables (factors 2 through 10 in Table 1), the sum of the variable means within a factor equals unity, apart from rounding error.

The statistical testing procedure is to introduce the factors stepwise, calculating a partial *F* value at each step. The factors are introduced in predetermined order (the order in which they are listed in the tables) and are tested in that order *only*. Thus we test the significance of factor 5, *given* factors 1 through 4; of factor 6, *given* factors 1 through 5; and so forth.

In Table 1, the factor "Education", for example, has an insignificant *F* value, given the previously introduced factors. It is unknown what the *F* value for "Education" would have been had it been introduced into the regression first, or indeed if the factors had been introduced in any order other than the one actually used. "Full analysis" might be construed to mean that all possible orderings of factors should be tested, which would be an impossible task computationally. With 10 factors, there are 10! possible orderings. No experimentation was done with different orderings. The ordering actually used is based upon an attempt to introduce factors ranked by decreasing order of interest. This procedure can be defended as being "statistically conservative", in that one probably finds fewer factors to be significant under the procedures actually utilized than could have been found through experimentation with different orderings.

---

[1]For actual conversion formulas, see Melichar, *op. cit.*, pp. 374-75.

The test used on factors is a partial F ratio. For the first factor introduced, this is calculated using:

$$(B.1) \quad F = \frac{R^2(n-K-1)}{(1-R^2)K}, \; d.f. = K, \; (n-K-1),$$

where K is the number of independent variables introduced into the equation (number of levels of the first factor minus unity; *if* the first factor is represented by a dummy variable; otherwise K = unity). For the second and subsequent factors, the formula is:

$$(B.2) \quad F = \frac{(R_A^2 - R_B^2)\,(n-K_1-K_2-1)}{(1-R_A^2)K_1}, \; d.f. = K, \; (n-K_1-K_2-1)$$

where:

-- R_A^2 is the R^2 after the inclusion of all levels of the factor being tested;

-- R_B^2 is the R^2 after the inclusion of all previously introduced factors;

-- K_1 is the number of levels of the factor being tested minus unity (assuming dummies);

-- K_2 is the number of independent variables previously included.

The last step is to compute t values for all pairwise comparisons of the coefficients within a factor, for those factors with significant partial F ratios *only*.[1] Comparisons with the omitted level of a factor can be computed from the "Estimated Coefficient" and "Standard Error" columns of the tables, as previously described. For comparisons between two levels of a factor, both included in the estimating equation, the following formula must be used:

[1]All tests in this Study are conducted at the .05 level of significance.

$$(B.3) \quad t = (b_i - b_j)/\sigma\sqrt{A_{ii} + A_{jj} - 2A_{ij}}$$

the b_i and b_j are the two coefficients being compared, σ is the standard error of estimate, and the A_{ij} are the elements in the i-th row and j-th column of $(X^tX)^{-1}$, the X matrix being the matrix of regressors.

When there are several significant factors, a separate table is prepared to report the t values -- e.g., Table 2. Note that the signs on the t values are based on subtracting level 2 from level 1; i.e., the -4.36 in Table 2 indicates that age level 45 years and over is significantly *less* likely to have found a job than age level 14-19 years.

The analyses of cross-classified tabular data in Chapter 5 are performed in the same manner. The primary difference is that we are dealing essentially with a single replication; i.e., we would not have an error term for testing if we estimated all interaction terms. It is a generally accepted statistical procedure where one is working with a three-or-more-factor tabulation to assume interaction effects of order greater than two to be zero, and thus to use these higher-order interactions as an error term. In the analyses reported in this Study, although the source data were a three-way tabulation, one factor was "lost" in defining a meaningful dependent variable. Thus use of the technique requires assuming that the "true" two-factor interaction effect is zero -- an assumption not generally supported by the data.

The principal differences in the means of reporting results stem from the fact that since a completely balanced design is used and all regressors are dummy variables, the standard errors for all possible pairwise comparisons within a factor are equal. Hence, since all pairwise comparisons can be performed using the adjusted coefficients and the standard error term applicable to the factor, no separate tables of t comparisons are reported.

APPENDIX C

The data utilized in Chapter 5 are derived from the Canadian Job Vacancy Survey (JVS). While a complete exposition of the technical details of this survey is not necessary here,[1] an understanding of some aspects of the survey is necessary in order to interpret the presentation in Chapter 4.

The survey design is two-phase; the first phase is a mail survey, followed by the second phase, which is an interview. It is conducted twice monthly, with each occurrence being termed an occasion. Approximately one-sixth of the mail sample is included in the interview phase on any given occasion, and the survey is oriented to the estimation of three-month moving averages of vacancies.

The concept that is utilized as the measure of search activity in this Study is the activity count, which differs from the concept of a vacancy in several important respects. A fundamental problem in job vacancy measurement is the problem of defining the concept being measured, and the central aspect of the definition utilized in the Canadian Job Vacancy Survey is the concept of "current activity", which may be defined as "some objective recruiting action which has been undertaken during some precisely specified time period".[2] Crudely stated, a vacancy is not a vacancy unless the employer does something to attempt to fill it. The information on current activity, gathered only in the interview phase of the survey, is thus collected primarily to validate the vacancy measurement. The use of this activity count information to study search behaviour is essentially a by-product of the Job Vacancy Survey.

---

[1]For a more complete description, see S. Ostry and A. Sunter, "Definitional and Design Aspects of the Canadian Job Vacancy Survey", *Journal of the American Statistical Association*, September 1970, pp. 1059-1070. This appendix draws heavily upon Ostry and Sunter's article.

[2]*Ibid.*, p. 1060.

The reporting unit for the survey, termed a Job Vacancy Reporting Unit (JVRU), was determined through an extensive profiling operation, designed first to identify those persons within the enterprise who can provide information about current job vacancies, and then to ensure that the classes of jobs for which these persons report are mutually exclusive and collectively exhaustive. The important point to note is that the JVRU is not generally synonymous with the firm, establishment, enterprise, company, or any other known classification. The JVRU is a concept unique to this survey. In specific instances, of course, the JVRU may be synonymous with any of the above classes.

We may now define concretely the "activity count" variable used in Chapter 5. Every job title listed on the survey by an individual JVRU that meets the definition of a vacancy counts as unity or, stated more precisely, the activity count is a count of the elements of the product set JVRU's crossed on job titles. The activity count differs from the vacancy count in that the activity count ignores the number of openings within the given job title in the JVRU. If a given JVRU has one vacancy for a "welder", this yields an activity count of unity, the same as if this JVRU had 20 vacancies for "welders".

Full understanding of the nature of the activity-count measure requires that the other aspects of the definition of a vacancy be known. The Canadian JVS uses a minimum duration of one day; i.e., jobs must have been vacant for the full reference day. This eliminates such things as day labour vacancies, which are always open for some period in the morning, if these openings are in fact filled during the day. Only vacancies for which employers are seeking workers from the external market are included in the definition. Vacancies that are, for example, posted on the company bulletin board inviting existing employees to bid on them are not counted as vacancies by the JVS unless and until some outside search is undertaken. The final element of definition refers to the fact that a definite opening must exist. Recruiting for vacancies that *may* materialize is excluded. The survey collects data (separately) on vacancies for immediate start and vacancies with a definite future starting date. The search must, in both cases, be current and, in the case of future starting date vacancies, it must be the recruiting that is anticipatory and not the fact of a vacancy.

A complete list of the search methods coded by the survey is included in the following table.

Table C-1

SEARCH METHODS CODED BY JOB VACANCY SURVEY

1.	Canada Manpower Centres
2.	Advertising (newspapers, periodicals)
3.	Unions
4.	Walk-in Interviews
5.	Search of Files
6.	Private Employment Agencies
7.	Trade Associations
8.	University, College, High School, Trade School Recruitment
9.	Personal Contact and Word of Mouth
10.	Display Sign "Help Wanted"
11.	Employee Referral
12.	Provincial Immigration Department
13.	Recruitment Outside Canada
14.	Other (includes Association of Professional Engineers, Technical Service Council, and Civil Service Commission)

The activity count data utilized is the total sample count over six occasions, unweighted. The weights were not used for a number of reasons, foremost of which is the fact that weighted data would not be very appropriate for the technique of multiple-discriminant-function analysis, as it would be difficult to define the number of "elements" in a reasonable manner.

Given that employers may be expected to use more than one search method for a given vacancy, at least in some cases, the method of search recorded in the activity count is the "main" activity utilized. It should also be noted that coverage of the Job Vacancy Survey was incomplete at the time the data utilized herein were collected. Finally, the data are neither pure cross-sections nor time series. Since both data sets pertain to periods of less than a year, there are unknown seasonal biases included.

For all of these reasons relating to the nature of the data, the empirical results of Chapter 5 should be viewed as illustrative. Thus the discussion of these results and, to an extent, the techniques of analysis chosen emphasizes broad patterns rather than the specific quantitative estimation of a given effect.

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Figure 1 6


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Search Behaviour in Canadian Job Markets

by Dennis R. Maki

Economic Council of Canada